



Public Service Commission

State of North Dakota

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March 28, 2011

Richard Southwick
Manager - Permitting & Environmental
South Heart Coal LLC
173 Cottonwood Road
Townsend, MT 59644

Dear Mr. Southwick:

The Reclamation Division has conducted a technical review of South Heart Coal LLC's (SHC) application for Surface Coal Mining Permit SHSH-1001 for the proposed South Heart Lignite Mine in Stark County, North Dakota. The following items must be satisfactorily addressed before the Reclamation Division will recommend Commission action on this application.

Table of Contents

1. The Table of Contents indicates that the Extended Mine Plan Area map is included as Figure 1.0-2 in Section 1.0; however, this map is not included in this section of the permit. Please correct this discrepancy. (GAW)
2. Please add a new appendix titled "Appendix 2.4-1 Laboratory Reports for All Sample Sites" to Section 2.4, and rename the existing Appendix 2.4-1 as "Appendix 2.4-2 Typical Soil Series Pedon Descriptions". Also, please ensure that the update is reflected in the permit Navigation Pane; the appendices are listed correctly in the permit Main Page. (WTG)
3. Please revise the title for Section 2.6.5.5.2 on page 9 to read "Monitoring Concurrent with Mining" so that it is consistent with the title in Section 2.6, Surface Water Information. (WTG)

General Technical

4. We noticed that various revision numbers (0, 1, and 2) are shown in headers, footers, and title blocks throughout the permit application. It is acceptable to continue to track permit changes with revision numbers during the technical review, but they must be removed before the permit is approved because revision numbers serve to note changes with subsequent revisions of approved permits. Please give consideration during the technical review as to when the revision numbers will be removed from the permit, and where future revision numbers would be positioned in narrative, tables, or appendices (header or footer) in an approved permit. (WTG & SAS)

Section 1.0 – Introductory, Legal, Financial, Compliance and Related Information

5. On page 9 of Section 1.1.5, the hyperlink to Section 3.2 opens to Section 3.1. Please repair this link so it opens to the correct section. This happens several other times throughout review of the permit. (MSK)
6. Please update the language in Subsection 1.2.6, Filing with County Auditor, to indicate that a copy of the permit has been filed with the county auditor's office. (SAS)
7. Prior to the permit approval, SHC will need to apply for and provide the MSHA identification number for this mine as required by NDAC 69-05.2-06-01(1)(b). Currently the application states that the number will be "...obtained before any operations begin." (SAS & GAW)
8. The law cite of NDCC 38-14.1-(1)(e) in the title of Section 1.3.4 is incorrect. It should be NDCC 38-14.1-14(1)(f). Please make the necessary corrections. (SAS)

Subsection 1.3.5 – Permit Area Surface and Coal Interest

9. On page 5 in the second paragraph, the third sentence should read "The percentage of surface ownership for the signatures received..." in order to clarify the intent of the statement. (SAS)
10. On page 5 in the third paragraph, the permit states that SHC has signed lease agreements for 100% of the surface and 81.6% of the coal within the permit boundary. The discussion then states that "This exceeds the 75% that is required in NDCC 38-18-05." However, this 75% requirement is not a permit-wide determination, but it applies to each individual tract of land in the permit area. Please correct the statement in Section 1.3.5 accordingly. It should be noted that a tract with less than 75% of the coal leased can be permitted for surface disturbances only as long as 100% of the surface is leased. However, actual mining and coal removal from such a tract (such as the unleased 50% coal interest owned by the State in Section 16, T139N, R98W) will not be allowed until at least 75% of the coal interests are leased. (SAS)

11. NDCC 38-18-06(3) and NDAC 69-05.2-06-03(1) require that certified copies of all surface and mineral leases must be included in the permit. While the application includes a notarized statement from the President of SHC that the lease documents are true and correct duplications of the original documents, permit applications typically contain copies of lease documents that have been recorded at the county Register of Deeds (Recorders) office. By providing copies of the recorded documents, we have greater certainty that the permit applicant actually has the legal right to mine the tracts in the proposed permit area. Until lease documents obtained by SHC are recorded, it is possible another entity could also obtain a mining lease for the same tract and have it recorded with the Register of Deeds. In that case, the other entity would have mining rights ahead of SHC. Therefore, we request that certified copies of lease documents recorded at the Stark County Register of Deeds, including the Register of Deeds certification of recording, be included in the application. (SAS & JRD)
12. Numerous provisions in the lease documents included in Appendices 1.3-1 and 1.3-2 have been blanked out. NDCC 38-14.1-13(3) states that the only information exempt from disclosure is limited to the coal quality information and a request for that exemption must be filed with and approved by the Commission in its discretion. Please include complete certified copies of the coal and surface leases currently in the permit. However, if SHC believes that provisions of a lease qualifies for an exception to North Dakota's open records laws, the request must provide the statutory and evidentiary basis for these conclusions, as well as the full copy of the lease and a redacted version of the lease. If the Commission determines that an exception to the open records laws applies under North Dakota Century Code, only the redacted versions of SHC's leases will be available to the public, unless a formal request process is followed. For more information on this, please refer to the Commission's Trade Secret procedural rule, NDAC Chapter 69-02-09. If SHC requests an exemption from the open records provisions of law for any of the leases, please include both full and redacted copies, and provide the statutory and evidentiary justification for your exemption request. (SAS)
13. Although oil and gas development occurs in the South Heart area, it appears no oil and gas leases were noted in Appendix 1.3-1 under the easement and other leaseholders listed for each tract. Based on the discussion on page 6 of Section 1.3.5, the review of the leaseholder records may have been limited to easements and leases affecting the surface and coal interests. Since NDCC 38-14.1-14(1)(c)(3) requires the listing of the names and address of all surface and subsurface leaseholders, any oil and gas leases for tracts within the proposed permit area need to be listed as well. If none of the tracts are subject to oil and gas leases, please note that in Section 1.3.5. (JRD)
14. Section 1.3.5 of the application must include a statement of whether or not SHC's right to enter and mine any of the lands in the proposed permit area is the subject of any pending court litigation. This is required by NDCC 38-14.1-14(1)(k). (JRD)

15. Figure 1.3-3 shows the coal ownership by tract number. NDAC 69-05.2-08-02(1)(a) requires that the map show the names of the coal owners both within the permit and the contiguous lands. Please add the coal owner names to the map. If the ownership list is too long to be contained within a particular tract, the list may be referenced to the side of the map where the full list may be displayed. (SAS)
16. The narrative in Section 1.4.2 states that Appendix 1.4-1 contains copies of the surface owner notification letters; however, Mary Louise Peters is not included in the list even though she is listed as the surface owner in the public notice, Appendix 1.2-3, and on the Surface Ownership Map, Figure 1.3-2. Please clarify how Mary Louise Peters is associated with PHP, LLP. (GAW & SAS)
17. PHP, LLP is not listed as a surface owner in either Appendix 1.3-1 or Figure 1.3-2, but a surface owner notification letter is provided for this apparent surface owner. Please explain or correct as appropriate. (SAS)

Subsection 1.5.5 – Relationship to Areas Designated Unsuitable

18. Section 1.5.5 states that the coal lease and surface lease agreements grant SHC the right to demolish or remove the existing dwellings, farm buildings and related structures within the permit boundary. While the later leases (obtained after the “Pooling Agreement”) grant SHC this right, it does not appear that the October 2, 2003 “Memorandum Giving Notice of Coal Lease and Surface Use Agreement” (pooling agreement) grants SHC such authority. Please review and state specifically where in the lease agreements it is stated the SHC has the right to demolish or remove the dwellings and buildings. The narrative in Section 1.5-5 references Section 3.2.2 of the permit but this section does not address obtaining a written waiver from the dwelling owners. Please include written waivers from the surface owners that grant SHC the right to mine within 500 feet of occupied dwellings as required by NDAC 69-05.2-04-01.4(2). NDCC 38-14-1-07(5) & NDCC 38-18-07(2) (GAW, DKM & SAS)
19. The narrative indicates that five farmsteads within the permit will be removed, if necessary, prior to mining. Farmsteads No. 3 and 4 appear to be more than 500 feet from any coal removal areas (pit areas delineated on Figure 3.2-1a) and, based on the provisions of NDCC 38-18-07(2), it may not be necessary to remove the buildings. Please clarify if there are other occupied structures or farm buildings within 500 feet of the coal removal activities that will not be moved and clarify if the listed farmsteads are the only buildings within the 500 foot mining disturbance boundary. Also, please include a statement on whether or not there are other occupied dwellings within a 500 feet radius of any of the planned mining related disturbances. (SAS)
20. Section 1.5.5, which discusses public road closures and relocations plans, as well as plans for conducting mining operations within 100 feet of the outside right of way of some public roads, needs to be amended to address the additional provisions in NDAC 69-05.2-04-01.3(3) and (4) regarding the Commission’s involvement in this process. These provisions require that copies of the road authority’s approval documents be

provided to the Commission and the Commission must then give notice, hold a hearing, and make written findings regarding these matters if not included as part of the road authority's approval process. (JRD)

Section 1.0 – Introductory... – Tables

21. In Table 1.5-1, the storm water permit is listed as a NPDES permit; however, the North Dakota Department of Health issues these permits in North Dakota and therefore issues a state NDPDES permit. Please update the listing to indicate that a "NDPDES" permit will be applied for. (MDB)

Section 1.0 – Introductory... – Figures

22. On Figure 1.3-1, Great Northern Project Development is shown as 100% owner of South Heart Development, LLC and the reader is referred to Tables 1.3-1A and 1.3-1B for detailed ownership and control information. Table 1.3-1A provides the ownership and control information for Great Northern Project Development, L.P. and Table 1.3-1B provides the ownership and control information for GNDP Inc. Based on their corporate structure, Great Northern Project Development, L.P. and GNDP Inc. appear to be different entities. If that is the case, Figure 1.3-1 (and corresponding ownership and control information) should be updated to reflect the relationship between these two entities (currently they are grouped together on Figure 1.3-1 as a single entity). NDAC 69-05.2-06-01(1)(e)(2). (DKM)
23. Figure 1.3-1 shows the percent ownership of the various entities that own SHC. Tables 1.3-1A through 1.3-1F should also incorporate this ownership information. For example, Allied Syngas Corporation and South Heart Development LLC should be listed as 50% owners of SHC on Table 1.3-1F. In addition, the list of Current or Pending Surface Coal Mining Permits on Table 1.3-1F should be updated to include Permit SHSH-1001 (currently states "None"). (DKM)

Section 1.0 – Appendix 1.2-4

24. Please provide an updated Certificate of Liability Insurance form, Appendix 1.2-4, and include the surface coal mining Permit No. (SHSH-1001) in the description section of the certificate and edit the language in the cancellation section to clarify that the issuing company will notify the certificate holder of pending cancellation or substantive changes to the policy, rather than just to endeavor to mail written notice. NDAC 69-05.2-12-20 and NDCC 38-14.1-14(3). (GAW, SAS & MDB)

Section 1.0 – Appendix 1.3-1 – Surface Ownership

25. More than half of the html links in Appendix 1.3-1 under the Agreement Signed column are not going to the correct surface exploration lease page or lease signature page and several seem to be broken as they do not open at all. Please check all the links for the tracts within this table and make the necessary corrections. (SAS)

26. The Coal Lease and Surface Use Agreement memorandum and Exhibit B in Appendices 1.3-1 and 1.3-2 do not list Sections 10, 14, 29, 33, and 34 as being part of the agreement. Parts of each section are within the permit boundary. Please explain this anomaly and correct the acres listed since this number is incorrect. (SAS)
27. Exhibit "A" in the Coal Lease and Surface Use Agreement in Appendices 1.3-1 and 1.3-2 has several differences in the names listed than the way the signature pages list the names. Please explain the following discrepancies: (SAS)
 - a. Both Gary and Barbara Meduna signed the lease but only Gary is listed;
 - b. Mary Ann Johnson signed the lease along with Robert but only Robert is listed;
 - c. LaVone G. Johnson signed the lease along with Richard but only Richard is listed;
 - d. Arnold Luptak signed the lease along with Mary but only Mary is listed;
 - e. No signature page was found for Phoebe Kostelecky Leo; and
 - f. Signature pages were found for coal owners Keith Kostelecky, Susan Sagun, and Debra Courson who are not on the list and should be.
28. Yearly surface leases appear to be in effect for Tracts S-1399810-C, S-1399814A, S-1399828-B, S-1399829-A, S-1399833-A, and S-1399834-A according to Appendix 1.3-1. Please provide documents that the terms of these leases have been extended through subsequent renewals or a long-term lease. (SAS)
29. Please provide the details for the "et al" with Mary Louise Peters' name in Tracts S-1399815-A and S-1399816-A. All names must be delineated for surface ownership. NDCC 38-14.1-14(1)(c). (SAS)
30. Part of the legal description for Title ID S-1399820-A on page 2 says "...less a tract in the..." Please add the missing legal description. (SAS)
31. The hyperlinks to the signature pages for Title ID S-1399820-A do not work. Please repair this hyperlink. (SAS)
32. Section 22 is listed twice in the legal description for Title ID S-1399822-A on page 2. Please correct as necessary. (SAS)
33. Only Patrick Kuylen signed the form on page 43 yet the notary public statement indicates that both Patrick Kuylen and Katherine Kuylen appeared and signed the form. Please have this form corrected to indicate that only one signature was obtained on October 7, 2003. (SAS)
34. For Title ID S-1399828-A the table lists part of the area belonging to Kuylen, Patrick plus Kuylen, Patrick and Katherine as apparent joint owners, but each has signed separate pages. The newspaper advertisement and the ownership map each list them as separate percentage owners with no joint ownership. Please review and correct this entry as necessary. (SAS)

35. For Title IDs S-1399834-A and S-1399824-B (the Emmil, Leocadia Family Trust land in Sections 34 and 24 on pages 3 and 5, respectively), please list the trustees under the name of the surface owner and provide the information required by NDCC 38-14.1-14(1)(c)(6). (SAS)
36. For Title IDs S-1399808-A and S-1399818-A (the Darlene L. Family Trust land in Sections 8 and 18 on pages 3 and 5, respectively), please list the trustees under the name of the surface owner and provide the information required by NDCC 38-14.1-14(1)(c)(6). (SAS)

Section 1.0 – Appendix 1.3-2 – Coal Ownership

37. For Title IDs C-1399809-F and C-1399809-G on page 1; Title IDs C-1399817-A and C-1399821-A on page 3; and Title ID C-1399827-A on page 6, please provide the information for Great Northern Properties Limited Partnership as required by NDCC 38-14.1-14(1)(c)(6). (SAS)
38. The legal description for Tract C-1399815-A on page 1 of 14 should read “Except for a tract in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ ” rather than a “tract in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ ”. Please make the necessary corrections. (SAS)
39. The legal description for Tract C-1399821-A on page 3 of 14 should refer to Section 21, not Section 17. Please make the necessary corrections. (SAS)
40. The sum of several tracts where coal has been leased does not equal that listed in the line with the Title ID and legal description. It appears that the individual coal percentage values may have been rounded off to whole numbers and therefore do not equal 100%. Please explain and/or correct the sums as needed. (SAS)
41. Please list the remaining ownership percentages of unleased coal by tract in Appendix 1.3-2 and put in the agreement column “No” or otherwise indicate that these tracts are unleased. The sum total of all leased and unleased coal should equal 100% for each coal tract. (SAS)
42. The Title ID C-1399816-A indicates that the Cory Perdaems Mineral Trust owns 10% of the coal but page 3 of this appendix says 5%. Please correct this discrepancy as necessary. (SAS)
43. Tract IDs C-1399815-A (page 1), C-1399815-B (page 2), C-1399816-A (page 2), and C-1399822-A (page 4) indicate that Anna Meyers signed the coal lease. Please indicate if she signed the coal lease prior to the trust being formed. If not, indicate why the trustees did not sign the lease or if she maintains control of the trust. (SAS)

44. Title ID C-1399822-A indicates that the Cory Perdaems Mineral Trust owns 20% of the coal yet the table on page 4 says 10%. Please correct this discrepancy as necessary. Note that the sum of the ownership for this tract only equals 90% on page 3 of 14. (SAS)
45. The newspaper notice lists a Linda L. Yoder as a coal owner in Section 22, but she is not listed along with the other owners for Tract IDs C-1399822-B and C-1399822-C. If she owns the percentage not leased she should still be listed with a comment indicating that the coal is unleased. Please correct as necessary. (SAS)
46. When summed, the percentage of coal leased Title ID C-1399822-B is only 92%, not 95%, as shown on page 4. Please correct. (SAS)
47. The description page for Title ID C-1399828-A does not list LaVone G. Johnson (with Richard) and Mary Ann Johnson (with Robert) as coal owners yet they both signed the coal leases. Please explain and correct as necessary (including page 6). (SAS)
48. Pages 5 and 8 indicate that the heirs of the Estate of Lewie and Ellen Kostecky signed the coal lease (3 of the 4 are protection leases). Normally the executor of the estate would sign the lease rather than the future heirs. Please explain the rationale for the heirs executing the lease. (SAS)

Section 1.0 – Appendix 1.4-1 – Surface Owner Notification Letters

49. Please add Mary Louise Peters to the bookmark listing after Jerry and Sandra Perdaems and provide an html link to page 73 where the information for Mary Louise Peters begins. (SAS)
50. The landowner preference statement on page 12 of Appendix 1.4-1 is for a tract in Section 33 that is not within the permit boundary. This page may be removed. (SAS)

Section 2.0 – Environmental Resources Information

51. The html link to Section 3.7 in the first paragraph of Section 2.0, Environmental Resource Information narrative, on page 2 goes to page 37 which is part of Section 3.6. Please correct this link. (SAS)

Section 2.1 – Cultural and Historic Resources

52. In the second paragraph on page 2 of Section 2.1.1, it states that the Chief Archaeologist of the Historic Preservation Division will be notified if any previously unrecorded archeological, cultural, or historic materials are discovered within the permit area. Please note that NDCC 38-14.1-14(1)(u)(6) states that the Director of the State Historical Society and the Commission must be contacted in the event of the discovery of any previously unrecorded materials. Please make the necessary corrections. (DKM)

53. A number of sites are listed as being potentially eligible for listing on the National Historic Register of Historic Places and SHC has committed to not disturbing these sites and to establish a 100 foot no-disturbance buffer around these sites. Please provide documentation from the SHPO indicating that a 100 foot buffer is adequate for each site. Any eligible or potentially eligible sites should be depicted on the Pit Layout and Facilities Map (Figure 3.1-1) with the appropriate setback. (DKM)
54. Tables 2.1-1, 2.1-5, and 2.1-8 contain much of the same information. Consideration should be given to incorporating these tables into a single table. Also once further testing is done and significance determinations are made, additional columns will be needed to provide the necessary information (e.g., mitigation status, etc). (DKM)
55. The first paragraph on page 1 of Section 2.1.1 states that the study area includes 7,150 acres; however, the Cultural Resource Inventory Report, Appendix 2.1-2, indicates the study area included 7,127 acres. Please correct this discrepancy. (DKM)
56. The first paragraph on page 3 of the Cultural Resource Inventory Report, Appendix 2.1-2, indicates that the PSC is the state agency with the Section 106 compliance responsibilities. The PSC does not have the Section 106 responsibilities within North Dakota but rather the State Historical Society has those responsibilities. Please make the necessary corrections. (DKM)
57. It is recommended that Table 2.1-7, Summary of Cultural Site Type, be renamed to more accurately reflect the contents of the table since it appears to be a summary of the isolated finds within the study area. (DKM)
58. It is recommended on Table 2.1-8, for those sites located within the study area but not within the permit area, that the Management Recommendations be changed from "Avoidance – mitigation if necessary" to "Avoidance – Outside of the permit area" since there will be no need to mitigate sites that are located outside of the permit boundary. (DKM)
59. The first paragraph on page 2 of Section 2.1.1 indicates that potentially eligible sites require further investigation if they are subject to impact. Please provide a clear commitment to test and mitigate, if necessary, all potentially eligible sites prior to disturbance. Also provide a commitment to mark the buffer zone around such sites in the field until such time that they have been cleared for disturbance. (DKM)

Section 2.3 – Geology

60. Please revise Section 2.3.2.5, Previous Mining, to meet the requirements of NDAC 69-05.2-08-02(1)(j), (k) and (l) which requires the specific location and extent of previous surface mines within the permit area as well as the dimensions of existing spoil, coal and non-coal waste, dams, embankments, impoundments and other information if relevant. The narrative in Section 2.3.2.5, Figure 2.3-15 and Appendix 2.3-1 do not provide the required detailed information. (GAW)

61. Please replace the word "cover" with the phrase "projected suitable plant growth material respread" where it is used in two places in one sentence of the second paragraph on page 19 in Section 2.3.3.1 - Overburden Sampling, in reference to the Public Service Commission Policy Memorandum No. 17. The revised sentence should read as follows: "In addition, overburden results from above the D Coal will be used to determine projected suitable plant growth material respread thickness, as based on methods provided in PSC Policy Memo No. 17 (PSC 1995b) for projected suitable plant growth material respread thickness determination for mining of one coal seam." (WTG)
62. Sections 2.5.2.6 through 2.5.3.3 discuss the presence of pre-mine wells and there are associated tables and appendices, but there is no reference to the map showing the location of these wells. Please revise the narratives as appropriate to reference and provide a link to the map, Figure 2.5-8-1 in Appendix 2.5-8. (GAW)
63. Please review the general and regional surface geology description on page 5 of Section 2.3.1, regarding the Cretaceous Hell Creek Formation. Permit narrative states that the Hell Creek Formation of the Zuni Sequence in the extreme southwestern part of the state is composed of marine sediment. While a couple of authors have identified a marine inter-tonguing depositional component to a relatively thin and confined section of the Hell Creek at this location and others (Breien Member), it is widely accepted that the Hell Creek Formation in both southwestern and south central North Dakota is largely sedimentary fluvial deltaic deposits of continental or terrestrial origin. This is evidenced by the abundance of dinosaur fossils that have been discovered within this formation in these areas, as well as the occurrence of coal as described in the discussion of Regional Coal Deposits on page 10 of Section 2.3.2.2 in the application. Please check your references and revise the narrative to describe the Hell Creek Formation as a predominantly non-marine depositional environment; although narrative regarding a marine component in a portion of this continental deposit in southwest North Dakota could remain in the narrative. (BEB)
64. Narrative on page 4 of Section 2.3.2.1 regarding the Study Area Geology describes the Fort Union Group and the Golden Valley Formation as consisting of palustrine to fluvio-deltaic sediments, overbank deposits, etc. Please add to this geological narrative by also describing the depositional environment of the Cannonball Formation, the marine-deposited formation also occurring within the Fort Union Group. (BEB)
65. Previous Mining narrative in Section 2.3.2.5 regarding the abandoned surface mine in the N½ of Section 16, T139N, R98W (AML Printout #349) describes that several tons of coal was produced from this mine every winter for local use prior to 1902. Please revise this particular sentence in the narrative to depict that several hundred tons of coal was produced from this mine every winter for local use, as is excerpted from Wilder (1902) and cited in the AML #349 Printout. (BEB)

66. Narrative in both geology and hydrology sections of the application reference the Dickinson Lignite Area. Please provide a map, or add to an existing map an outline of the limits of the referenced Dickinson Lignite Area and provide at least one link to the map in the narrative portions of the permit describing or referencing the Dickinson Lignite Area. (BEB)
67. Narrative in Section 2.3.2.1 describes a normal fault mapped outside of the town of South Heart and the fault trend line location that is included in the narrative describes a number of sections within T13N, R98W. Please revise the location typographical error to place the structure in the correct township. (BEB)
68. C.A. Armstrong – 1984 has described the presence of a north-south trending anticlinal structure with subsurface continuance into the D Coal (Fryburg) coal bed and possibly deeper coal beds in Townships 137N, 138N, and 139N, Range 98W which would likely place the anticline within the proposed study area. Please provide narrative somewhere in the Geology section of the application addressing this particular structure, and its presence or absence within the proposed permit area. (BEB)
69. Section 2.3.2.5 identifies, describes, and provides locations of known abandoned mines within and adjacent to the Study Area. Since some of these are close to the proposed permit area, we recommend that SHC describe measures to comply with NDAC 69-05.2-09-10 in the event that active mining operations results in the discovery of a previously unknown abandoned mine, particularly an abandoned underground mine. (BEB)
70. Study Area Geology narrative in Section 2.3.2.1 provides relevant information concerning small scale structure in the area of the Little Badlands. Because of the significance of the Little Badlands regarding surface water quality issues affecting the South Tributary, South Branch Heart River, and ultimately the Heart River, please supplement this narrative by describing the geologic strata and erosive sediments contained within the Little Badlands. NDAC 69-05.2-08-04(3)(a). (BEB)
71. Due to recent oil and gas activity in western North Dakota and possibly near the South Heart area, please update the information provided in the narrative of Section 2.3.2.6 and associated figures and appendices if required, describing whether any additional oil exploration or development activity has occurred within or near the Study Area subsequent to the time that the permit application was submitted to the Commission in March 2010. (BEB)
72. Narrative describing overburden texture in Section 2.3.4.6 states that the percent sand value for overburden samples above the D Coal within the Overburden Study Area ranges from less than 0% to 91.3%. Please address this typographical error and additionally, please provide a link in this narrative directing the reader to Table 2.3-9. (BEB)

73. Section 2.3.4.8 describes the whole rock acid digestion analysis performed within the Study Area and the last sentence provides a reference to Krauskopf and Bird (1995) for comparative analysis. The narrative ends abruptly and it appears a link to this reference in Section 5 was intended. Please either provide a link to the References section (5), or provide the comparative data in the narrative. (BEB)
74. Narrative on page 9 of Section 2.3.2.2 describes the presence of silcrete in the Taylor bed, Bear Den Member of the Golden Valley Formation and we respectfully question the validity of the closing statement describing that silcrete from the Taylor bed is usually found in gravel deposits within the Study Area. Considering the paludal/palustrine depositional environment required for silcrete formation and the depositional processes associated with sand and gravel accumulation, in addition to personal field observations, we find it unlikely for silcrete to be associated with the local gravel deposits. Silcrete in North Dakota is generally left as a lag deposit and often forms the cap rock of hills and buttes as a result of differential erosion. If baseline geologic mapping within the Study Area has confirmed the association of silcrete within local gravel deposits, please provide the location(s) of those deposits in the narrative or otherwise revise or eliminate the narrative. (BEB)
75. Narrative in Section 2.3.2.7 describes the occurrence of uranium generally within (below) 200 feet of the Arikaree Formation and White River Group unconformity source rock in parts of southwestern North Dakota as referenced from (Murphy 2006a). Please revise this narrative based on additional information provided in the report (Uranium Deposits in Southwestern North Dakota, Murphy 2007b) which describes that extensive drilling by mineral companies in the 1970s generated gamma logs that indicated zones of uranium are present more than 800 feet below the probable position of the White River unconformity. Whether or not uranium found at this depth was derived from the Arikaree/White River strata is unknown at this time and inconsequential to the narrative provided; however, the narrative should be revised to provide the range of uranium occurrence as reported between 200-800 feet below surface. (BEB)
76. Discussions regarding the potential for uranium occurrence within the Study Area are provided in several sections of the permit application and we request that you provide additional information in the application that more clearly defines the measured quantities of uranium that have been identified and discussed within the various stratigraphic horizons and coal seams within the Study Area by various authors and SHC consultants. North Dakota's State Geologist, Edward C. Murphy has conducted geologic investigations regarding the occurrence of uranium throughout western North Dakota, including the Study Area, and his work has appropriately been heavily referenced in permit application narrative in Sections 2.3.2.7 and 2.3.6.4. Narrative and map information provided in reference documents (Murphy, Edward C. 2006a) and (Murphy, Edward C. 2006b) provides the measurement unit for uranium and other radioactive elements on gamma ray geophysical logs in gamma counts per second (gcps) while other authors that have conducted uranium studies in western North Dakota present their data in gamma counts per inch (gcpi). Narrative in Section

2.3.6.4 describes the use of gamma ray logs to measure radioactivity by SHC consultants and those logging results are provided in API units (American Petroleum Institute) and the API value is the measurement unit utilized during geophysical logging within the Study Area. Considering that comparisons in the application narrative are drawn between measured levels of radioactive elements from different authors using different measurement units, please provide additional narrative in Section 2.3.6.4 describing the differences, parallels, and conversion methods (if any) of the measurements provided and cited (gcps, gcpi, and API) so that all permit reviewers can make a logical comparison between the various measured parameters provided by SHC and other referenced authors. (BEB)

77. There is a discussion in Section 2.3.2.7 of the uranium concentration detected in coal composites from the Study Area and the narrative draws comparison of these results with uraniferous coal found in other areas of southwestern North Dakota. This notes that the highest uranium concentration detected in the Study Area coal composites was 4.6 mg/kg, considered relatively low compared to coal found in other areas of southwestern North Dakota. Please explain in the narrative of Section 2.3.2.7 that the measurement units of mg/kg and parts per million (ppm) are correlative and that 1 mg/kg is the same as 1 ppm, which is the unit of measurement for uranium that is provided in the detailed incremental analyses for the cored holes of Appendix 2.3-19.1. A footnote in the incremental analyses appendix providing the same correlation is also requested. (BEB)
78. Please provide narrative derived from reference data or baseline field work in Section 2.3.2.7, Uranium Deposits in North Dakota, describing a value or range of values that is considered to be typical background level for measurements of radioactivity in the gamma ray log in overburden and coal in western North Dakota. Also, please discuss a value or range of values considered to be typical background level for measurements of uranium concentration in overburden and coal in western North Dakota. (BEB)
79. The North Dakota Geological Survey's Geologic Investigations No. 40, Uranium Deposits in Southwestern North Dakota (Murphy, Edward C. 2007b) provides examples of the unpredictable occurrence of uranium in some areas of western North Dakota. Information provided in the permit application has demonstrated a commitment by SHC to identify and analyze numerous lithostratigraphic zones throughout the Study Area in determination of the occurrence of uranium and associated radioactive elements during baseline environmental work. However, considering that SHC has identified areas of elevated radioactivity relatively close to the Study Area (within approximately 1 mile) as described in the permit application, and considering the referenced and documented unpredictable nature of the occurrence of uranium in this area, the Reclamation Division has had discussions with Mr. Murphy concerning possible uranium issues within this proposed permit area. Mr. Murphy indicated that he is compiling geophysical and gamma ray log information into maps, assessing the potential for the occurrence of uranium within the Permit Area, and will provide us with his recommendations regarding uranium matters at the proposed mine. This is not a deficiency or information request, but please be advised

that additional or follow-up deficiencies concerning uranium may be forthcoming, pending Mr. Murphy's review. (BEB)

80. The Summary of Overburden Geology on page 24 of Section 2.3.4.1 describes the coal seams within the Study Area and lists the F1 coal seam along with the E and E1 seams; however, the F1 coal seam should be changed to denote the F coal seam, as there is no F1 coal seam identified in the Study Area to our knowledge. (BEB)

Section 2.3 – Geology Tables

81. Table 2.3-1 provides a generalized stratigraphic column for the Williston Basin and in order to provide accurate information in the permit application, the table needs to be revised. For example, Glacial Deposits on the table are grouped with the Tertiary Period; however, glacial advances in North Dakota occurred during the Pleistocene Epoch of the Quaternary Period, not the Tertiary. Additionally, the depositional Sequences, Groups and Formations are all listed in descending order, but the Periods (with the exception of Tertiary at the top) are listed in a quasi-ascending order, placing the Groups and Formations into the wrong Periods. Please add the Quaternary Period to the table with the corresponding Pleistocene Epoch (glacial advances) and place the Periods in their correct descending order. (BEB)
82. Several of the footnotes to tables such as Table 2.3-5, 2.3-6, 2.3-19 and perhaps other footnoted tables, figures or appendices within the permit lists the geodetic survey datum as NAD 72. It is assumed the intention was to denote NAD 27 as the reference datum utilized. Please check all tables, appendices and figures provided in the application and correct the typographical errors referencing NAD 72 as the utilized survey datum. (BEB)
83. Please revise Table 2.3-7, Overburden Analytes - Suite One, to include citations for USDA Agricultural Handbook No. 525 where applicable for overburden chemical analysis (see requirement in NDAC 69-05.2-08-05-2). Agricultural Handbook No. 525 cites USDA Agricultural Handbook No. 60 or ASA Monograph No. 9 methods for chemical analysis. The Method Code column for Table 2.3-7 should therefore include a primary citation for Agricultural Handbook No. 525 followed by the specific ASA Monograph No. 9 method used and cited in Agricultural Handbook No. 525. The reference to an EPA method should be removed if it was not used. Please also update Section 5.0 - References Cited to include citations for USDA Agricultural Handbook No. 525, USDA Agricultural Handbook No. 60, and ASA Monograph No. 9 in the Section 2.3 references. (WTG)

Section 2.3 – Geology Figures

84. Narrative is provided within the permit application describing the various types and locations of geological structural controls within and adjacent to the Study Area and although not required by law or rules, adequate cartographic representation of these structures should be depicted on an appropriately scaled map. It appears that either the

Geology Study Area with Borehole Locations Map, Figure 2.3-1, or the Oil and Gas Wells Map, Figure 2.3-16 would be an appropriate map in which to provide the information. Please consider the request. (BEB)

85. Please separate the overlap of drillhole numbers and other labeling information in the center of Section 21 and in the SW¼ of Section 23 on the D Coal Heating Value Map of Figure 2.3-35 so that the information provided is legible. (BEB)
86. All lithostratigraphic units of importance from the F Coal down to the Tongue River Formation (Bullion Creek) have been incorporated into the Geologic Cross-Sections Map of Figure 2.3-4 with the exception of alluvium. Please provide a unique legend index color to represent alluvium and incorporate the locations of alluvial channel fills of the major drainages into the cross-sections where appropriate. It is unnecessary to separate older alluvial deposits from modern alluvial deposits for the requested information. NDCC 38-14.1-14(1)(r)(1). (BEB)
87. Legend data for the E1, E, and F Coal Thickness Isopach Maps, Figures 2.3-8, 2.3-9, and 2.3-10 respectively, all indicate that a 2-foot contour interval was utilized; however, review of the maps indicates that an isopach contour interval of 1 foot was utilized. Please revise the legend information provided on the maps or the contour intervals on the maps. (BEB)
88. Please define the actual limits of mining or surface disturbance of the abandoned surface mine (AML printout #349) on Figure 2.3-15 down to at least a quarter-quarter section, as opposed to labeling the entire N½ of Section 16 (most of which is cropland) on the map as the location of the abandoned mine site. A pedestrian survey by a qualified scientist or field technician should be able to depict the location of the abandoned surface mine reported to be located in Section 16, T139N, R98W within the proposed permit area and adjacent Study Area. Baseline environmental work associated with vegetation and soil surveys, cultural resource investigations or geologic mapping operations should be able to discern the specific location of this abandoned surface mine site. (BEB)
89. Pursuant to NDAC 69-05.2-08-05(2)(f), please revise the D Coal Overburden Thickness Isopach Map in Figure 2.3-7 to provide a contour interval of ten feet, opposed to the twenty foot contour interval that is currently provided. (BEB)

Section 2.3 – Geology Appendices

90. Please review, and revise as necessary, the entry for Shallow Overburden Borehole SOSH-42 on the cover page of Appendix 2.3-11 - Shallow Overburden Laboratory Data Sheets. It does not appear that a borehole named as such was completed. (WTG)
91. Appendix 2.3-17 provides geophysical logs for over 100 drilled overburden holes within the proposed permit area and we request that SHC bookmark the drillhole identification numbers so specific logs are easier to locate. (BEB)

92. Please check your notes for coal quality information derived from drillhole SHOB-08R as presented in Appendix 2.3-20.7 as the sample intervals from both 70-85 feet and from 250-260 feet indicate the D Coal seam as the sampled coal seam interval. It appears the 250-260 foot sample interval seam should be changed to denote the HT Butte Coal. Please review and update the spreadsheet as deemed necessary. (BEB)

Section 2.4 – Soil Resources

93. Please revise the use of the geologic term “member” on page 3 of the Section 2.4.3.2.1 - Geology and Parent Materials narrative. In two places of this section the terms formation and member are incorrectly used interchangeably with regard to the Sentinel Butte Formation. Please also correct the spelling for Sentinel. Please also review the narrative of the Golden Valley Formation to ensure that the description of its members is consistent with the narrative in 2.3.2.2 - Study Area Stratigraphy. (WTG)
94. Please make the following revisions to native grasses in the Section 2.4.3.2.3 - Vegetation and Land Use narrative: revise the common name for *Agropyron smithii* to read “Western Wheatgrass”; revise the common name for *Andropogon scoparius* to read “Little Bluestem”; and revise the common name for *Distichlis spicata* to read “Inland saltgrass”. (WTG)
95. Please make the following revisions to parenthetical references of other permit sections in the Section 2.4.3.2.3 - Vegetation and Land Use narrative: Section 2.7.2 should be parenthetically referenced as (Pre-mining Vegetation) rather than (Vegetation Baseline Study Report); and Section 2.7.1 should be parenthetically referenced as (Pre-mining Land Use) rather than (Land Use Baseline Study Report). (WTG)
96. Please reference and create hyperlinks for Figure 2.4-1 - Overview of Soil Study Area, in the first and second paragraphs on pages 6 and 7 of Section 2.4.4.3 - Pedon Descriptions, where the narrative describes soil pedon observation points that were recorded or sampled. (WTG)
97. Please review, and revise as necessary, the Site Data list of information on page 7 of Section 2.4.4.3 - Pedon Descriptions, described as being included on complete pedon descriptions of Appendix 2.4-2 - Typical Soil Series Pedon Descriptions. It appears that at least eight of the items listed in the Site Data paragraph are not included on the pedon description form. Please review the form and accurately describe its contents in the Site Data list. (WTG)
98. Please revise the Horizon Data list of information on page 7 of Section 2.4.4.3 - Pedon Descriptions, described as being included on complete pedon descriptions of Appendix 2.4-2 - Typical Soil Series Pedon Descriptions to replace “estimated clay percent” with “clay percent from textural analysis”. In a related deficiency, we request that clay percentages be noted on the series pedon descriptions only when the percentage is derived from a textual analysis because an estimated clay percentage is inherent in any

field texture determination, and noting a clay percentage number is inferring a level of accuracy not achievable in field texture determinations. Based on the information in Table 2.4-2, Laboratory Results for all Samples, it appears that textural analysis was completed on 22 of the 37 pedons described in Appendix 2.4-2. During our review we noticed that estimated clay percent was noted on most, but not all, of the pedon horizons that were not sampled for analysis. As a matter of consistency, please note the clay percent only when supported by a textural analysis. (WTG)

99. Please reference and create a hyperlink for Table 2.4-6, Observation Point Classification and Salvage Recommendations, in the last paragraph of Section 2.4.4.3 - Pedon Descriptions, where the narrative describes recorded observation points. (WTG)
100. Please revise the reference to Section 2.10 in the last paragraph of the Section 2.4.4.7 - Soil Mapping narrative to read "Pre-mining Wetland Report" rather than "Wetland Baseline Study Report", and revise the hyperlink to read (Appendix 2.10-1) rather than (Section 2.10) because it appears that Appendix 2.10-1 is the more appropriate reference. (WTG)
101. Please revise the administrative code citation in Section 2.4.4.9 - Prime Farmlands to read "NDAC 69-05.2-08-09". (WTG)
102. Please revise the hyperlink to Section 2.10-1 in the Harriet soil series description in the Section 2.4.5.2 - Soil Series and Map Unit Components narrative to read "Appendix 2.10-1" and revise "Wetland Baseline Study Report" to read "Pre-mining Wetland Report". (WTG)
103. Please revise the hyperlink to Section 2.10-1 in the Hoven soil series description in the Section 2.4.5.2 - Soil Series and Map Unit Components narrative to read "Appendix 2.10-1" and revise "Wetland Baseline Study Report" to read "Pre-mining Wetland Report". (WTG)
104. Please make the following additions to the first paragraph of Section 2.4.5.3 - Delineations and Map Units: insert the phrase "and lift thicknesses." following the sentence ending "... assigned the appropriate map unit symbol."; and end the paragraph with the sentence "The map unit legend is displayed on each soil survey map and is also listed in Table 2.4-5." Please also create a hyperlink for Table 2.4-5 in the paragraph. (WTG)
105. Please revise the hyperlink to Section 2.10-1 in the last paragraph of Section 2.4.5.3 - Delineations and Map Units to read "Appendix 2.10-1" and revise "Wetlands" to read "Pre-mining Wetland Report". (WTG)
106. Please clarify, and revise as necessary, the last sentence and hyperlink of Section 2.4.5.3 - Delineations and Map Units. It appears that the sentence may be referring to volumes of suitable plant growth material by landowner, but the intention is not clear

and the hyperlink is not specific. If the sentence was intended to refer the reader to volumes of suitable plant growth material by landowner, please revise the sentence as such, and revise the hyperlink to link to Table 3.1-5. (WTG)

107. Please expand Section 2.4.5.4 - Observation Points and Salvage Recommendations to explain that the observation points where used apply to localized, and usually variable, salvage lift thicknesses in delineations of the same map unit across the permit area. (WTG)
108. Please revise both hyperlinks to Section 2.10-1 in the last paragraph of Section 2.4.5.6 - Hydric Soils to read "Appendix 2.10-1" and revise "Wetland Baseline Study Report" to read "Pre-mining Wetland Report". (WTG)

Section 2.4 – Soil Resources – Tables

109. Please revise Table 2.4-2 - Laboratory Results for all Samples to label the typical pedon site parenthetically, thereby allowing the reader to easily cross reference the site laboratory results in Table 2.4-2 with the typical pedon descriptions in Appendix 2.4-2, Typical Soil Series Pedon Descriptions. (WTG)
110. Please revise Table 2.4-2 - Laboratory Results for all Samples to add all of the horizon pH values obtained from the complete sample analysis. It appears that the pH values have been entered in Table 2.4-2 for only 18 of the 66 sites for which complete sample analysis was conducted. A cursory review of 10 of the remaining 48 complete analysis sites for which the pH values are blank indicates that pH was analyzed, and the values are present on the horizon sample laboratory analysis reports in Appendix 2.4-1 - Laboratory Reports for All Sample Sites. (WTG)
111. Please revise the title of Table 2.4-5 - Soil Map Unit Acreage within the Permit Boundary to read "Soil Map Unit Legend and Acreage within the Permit Boundary". As currently presented, the soil map unit legend is only shown on Figures 2.4-2A, B, and C, but it should also be available in separate table form. (WTG)
112. Please incorporate salinity information into Table 2.4-4 to indicate the salinity level (slight, moderate, strong, or very strong) of the various saline taxadjunt map units. This information is needed to assign the proper productivity index to the map unit. (DKM)
113. Current mapping unit delineations in Tables 2.4-4 and 2.4-5; Figures 2.4-2A, 2.4-2B, and 2.4-2C; and Appendix 2.7.1-1 make it difficult to estimate actual acreages of some soils series for use in determining land use productivity, especially for croplands and tame pasturelands, by landowner. Thus the soils information must be corrected as follows: (SAS)

- a. All soil mapping units for croplands and tame pasturelands must be broken down by individual slope phase when there is more than a single slope phase given. This would result in adjusting the soil map symbols accordingly. and
- b. Use of terms such as fluvents and entic haplustolls must have that soil mapping unit delineated into either individual soil mapping units by soil series or, at minimum, show the percentage of each mapping unit soil series making up the unit.

Section 2. 4 – Soils Resources – Figures

114. Please reset the section numbers on Figures 2.4-2A through 2C to near the approximate center of the respective section and enlarge the section numbers. Many of the section numbers are located too near the edges of the section making them difficult to find. Enlarging the font size will also aid in locating the numbers on the maps. (SAS)

Section 2. 4 – Soils Resources –Appendices

115. The following items require review, and revision as necessary, of data presented in Appendix 2.4-2, Typical Soil Series Pedon Descriptions. Most of these items are related to the request that clay percentages be noted on the series pedon descriptions only when the percentage is derived from a textual analysis:
 - a. It appears that the data in the texture and percent clay column for the Cabba series typical pedon description in Appendix 2.4-2 is incomplete and incorrect when it is compared to the laboratory results for the pedon in Table 2.4-2. Please review and revise as necessary. (WTG)
 - b. Please remove the clay percentage numbers from the texture and percent clay column of the Daglum series taxadjunct pedon description in Appendix 2.4-2 because laboratory analysis for the pedon in Table 2.4-2 is limited to EC and SAR. Please also review and revise as necessary the EC and SAR comments for the lower four horizons because only some of the data is supported by data in Table 2.4-2. (WTG)
 - c. Please remove the clay percentage numbers from the texture and percent clay column of the Dogtooth series pedon description in Appendix 2.4-2 because laboratory analysis for the pedon in Table 2.4-2 is limited to EC and SAR. (WTG)
 - d. Please remove the clay percentage numbers from the texture and percent clay column of the Flasher series pedon description in Appendix 2.4-2 because laboratory analysis was not conducted on the horizons. (WTG)

- e. Please remove the clay percentage numbers from the texture and percent clay column of the Janesburg series taxadjunct pedon description in Appendix 2.4-2 because laboratory analysis for the pedon in Table 2.4-2 is limited to EC and SAR. (WTG)
- f. Please remove the clay percentage numbers from the texture and percent clay column of the Korell series pedon description in Appendix 2.4-2 because laboratory analysis was not conducted on the horizons. (WTG)
- g. It appears that the clay percentage in the texture and percent clay column for the Lawther series typical pedon description in Appendix 2.4-2 should read 33.8 rather than 27.5 for the Ap horizon. Please review and revise as necessary. (WTG)
- h. Please remove the clay percentage numbers from the texture and percent clay column of the Lohler series pedon description in Appendix 2.4-2 because laboratory analysis was not conducted on the horizons. (WTG)
- i. Please remove the clay percentage numbers from the texture and percent clay column of the Manning series pedon description in Appendix 2.4-2 - Typical Soil Series Pedon Descriptions because laboratory analysis was not conducted on the horizons. (WTG)
- j. Please remove the clay percentage numbers from the texture and percent clay column of the Morton series pedon description in Appendix 2.4-2 because laboratory analysis for the pedon in Table 2.4-2 is limited to EC and SAR. (WTG)
- k. Please review and revise as necessary the EC and SAR comments for the lowest horizon of the Rhoades series pedon description in Appendix 2.4-2 because the EC and SAR values listed for the 40-50 inch horizon are taken from the laboratory analysis for 50-60 inch horizon in Table 2.4-2. (WTG)
- l. A remark on the "Other Comments" line of the Sen series pedon description in Appendix 2.4-2 states that the site (061007-T03A) was not sampled, but it appears that EC and SAR laboratory analysis was completed for three horizons of the pedon as shown in Table 2.4-2. Please review and revise Appendix 2.4-2 as necessary. (WTG)
- m. Please remove the clay percentage numbers from the texture and percent clay column of the Vebar series pedon description in Appendix 2.4-2 because laboratory analysis was not conducted on the horizons. (WTG)
- n. Please remove the clay percentage numbers from the texture and percent clay column of the Velva series pedon description in Appendix 2.4-2 because laboratory analysis was not conducted on the horizons. (WTG)

- o. It appears that the clay percentage in the texture and percent clay column for the Wayden series typical pedon description in Appendix 2.4-2 should read 45 rather than 43.8 for the Cr horizon. Please review and revise as necessary. (WTG)
- p. Please remove the clay percentage numbers from the texture and percent clay column of the Farland series pedon description in Appendix 2.4-2 because laboratory analysis for the pedon in Table 2.4-2 is limited to EC and SAR. (WTG)

Section 2.5 – Ground Water Hydrology

- 116. Narrative in Section 2.5.2.3 regarding surface water features within the Study Area describes stream classification of the Heart River, South Branch Heart River, West Tributary, and South Tributary (perennial, intermittent, ephemeral). Please add to the narrative by providing the reference source(s) for these determinations, or by generally describing the permit baseline information utilized for stream classification determination, or both if that is the case. Also, please note that ephemeral, intermittent, and perennial streams must be classified using the definitions under NDAC 69-05.2-01-02(29), (50) and (66), respectively. (BEB)
- 117. The alluvial aquifers associated with the Heart River and South Branch Heart River are identified and monitored ground water aquifers within the permit and adjacent area and the narrative of aquifers in Section 2.5.2.7 should provide relevant information specific to these Permit Area and adjacent ground water resources. (BEB)
- 118. Section 2.5.4.3 provides narrative concerning post-mining reclamation monitoring wells to be installed in reclaimed spoils and we request that the approximate locations of these proposed reclamation monitoring wells be depicted on the Monitoring Wells Location Map, Figure 2.5-1 and a unique symbol be provided in the legend for the proposed well locations. Other mines in North Dakota are now providing this information on maps as well, and we also ask that you provide a link in the reclamation monitoring well narrative of Section 2.5.4.3 connecting to the map. We also request that a reclamation monitoring well be proposed for a location near the center or the N½ of Section 16, T139N, R98W in determination of post-mining reclamation recharge capacity to the base of spoils zone. (BEB)
- 119. Overburden – D Coal Aquifer narrative on page 19 of Section 2.5.2.7 describes that seeps and springs in the Study Area likely originate from subcrops of coal stringers and other more permeable units in the overburden above the D Coal. Please review your collected field information, lithologic logs and geologic cross-sections of the study area and based on your review, consider revising the narrative to state the likelihood of some of the seeps and springs as originating from outcropping units as opposed to subcropping units as that is usually the case in western North Dakota. (BEB)

120. Please review the narrative in Section 2.5.2.7 regarding the specific discharge points of the various seep/spring locations because in some instances discharge to surface may be a result of ground water interflow processes as we suspect may be the case with the SHSS-20 and 20A springs. We request that more specific details be provided in the narrative for each of the eight identified springs within the Study Area regarding their source within the stratigraphic column, principally because most of the identified springs are located adjacent to, but outside of the proposed permit area. NDAC 69-05.2-08-06(1)(a). (BEB)
121. Continuing narrative in the same paragraph describes that seep/spring locations SHSS-16, and SHSS-17ST, appear to be developed with pipes installed in the discharge area. Information that is provided in Appendix 2.5-4 describes that flow was also measured quantitatively from SHSS-17A from pipe discharge, presumably indicating a developed spring. Please revise the narrative to include seep/spring SHSS-17A in the list of developed springs in this narrative, as that appears to be the case. (BEB)
122. Somewhere in the hydrology narrative of Section 2.5, please provide a more detailed discussion regarding recharge to ground water systems in this area of North Dakota, times and durations of recharge events, expected evaporative rates of precipitation using climatic data presented in the application, and expected or determined current recharge volumes to aquifers in the pre-mine and post-mine setting. (BEB)
123. Probable Ground Water Hydrologic Consequences narrative concerning impacts to ground water quantity on pages 20 and 21 of Section 2.5.3.1 describes the expected development of a cone of depression around active mining pits, expected water level decline in the Overburden-D Coal Aquifer, and the expected radius of influence of mine pit water drawdown on hydrostatic head in the described aquifer. Based on aquifer testing results completed by SHC consultants and applying the determined aquifer hydraulic properties with projected pit dimensions, please validate the ground water drawdown narrative by providing the distance drawdown calculations necessary to demonstrate the expected rates of pit water inflow as evidence that the cone of depression within water bearing units is expected to extend to the estimated one-mile radius of the mine pits. (BEB)
124. Narrative in the PHC describes that the extent of significant drawdown (greater than seasonal variation) will likely be within one mile of the mine pits, which is considered to be typical for coal mining operations within the Williston Basin. However, in consideration that baseline monitoring has defined general seasonal variation values determined to be approximately 1 foot, please add to this narrative by describing to what extent the significant drawdown (depth in feet) is projected to be at various distances radiating outward from the active mining pits and also at the projected 1-mile radial distance from the pits. (BEB)
125. Considering that baseline information provided in the application indicates the Heart River within the Study Area to be a gaining stream partly due to Overburden-D Coal Aquifer ground water discharges to the Heart River up-gradient of the town of South Heart, please add to the narrative of Section 2.5.3.1 - Impacts to Ground Water

Quantity of the Probable Ground Water Hydrologic Consequences, by describing the predicted impacts of proposed mining operations to down-gradient water supply of the alluvial aquifer in and around the town of South Heart. In consideration of the proposed size of mining pits, pit progression and timing, coupled with aquifer hydraulic properties determined from aquifer testing procedures, SHC needs to provide the information and calculations required to determine pre-mine contribution of base flow to the Heart River and its associated alluvial aquifer from the proposed mining operations to down-gradient locations from the disturbance areas. If adverse impacts are projected, mitigation plans will need to be incorporated into the Probable Hydrologic Consequences and Hydrologic Reclamation Plan, Section 2.5.3. Significant and unmitigated impacts of water level decline to the Heart River or its alluvial aquifer would be construed as material damage to the hydrologic balance off-permit. NDAC 69-05.2-08-04(1) and 69-05.2-09-12(2). (BEB)

126. SHC needs to provide additional information in the Probable Hydrologic Consequences sections of the permit application regarding expected post-mining water quality to the Heart River and its associated alluvial aquifer, as well as to the South Branch Heart River and its associated alluvial aquifer. Current narrative in the permit PHC regarding water quality provides generalized information and empirical data from other mining operations in North Dakota. However, the PHC needs to provide information specific to this application from baseline data and information collected within the Study Area. References to technical reports and professional studies conducted on spoils water and ground water/surface water interaction including the processes of dilution, hydrodynamic dispersion, and attenuation of various water chemistry parameters with unmined blocks of lignite are all items that need to be addressed in the PHC. The results of the permit information provided and the expected consequences and ability of SHC to prevent, minimize or mitigate these hydrologic resource consequences are all being considered in determination of SHC's ability to minimize disturbance to the hydrologic balance within the mining permit area and their ability to prevent material damage to the hydrologic balance outside of the permit area. NDAC 69-05.2-16-13. (BEB)
127. Restoration and Replacement of Wells and Developed Springs narrative in Section 2.5.3.3 of the Ground Water Hydrologic Reclamation Plan describes the replacement of affected wells and developed/certified springs within the proposed permit and adjacent areas as required by the law and rules and we have no concerns with the language that is provided regarding those specific replacement plans. However, there are many instances in North Dakota where undeveloped seeps and springs provide an important, and oftentimes the only source of water supply to downstream drainages that are utilized by landowners to provide their sole resource for watering of cattle, typically due to the development of linear wetlands and pooling of water in deep holes associated with the drainage. Narrative in this section needs to address replacement requirements and plans for all seeps and springs that currently provide a usable water source to downstream interests, if identified, not just the developed springs. Please review your data and revise this section if necessary. NDCC 38-14.1-14-2(i)(3). (BEB)

128. The State Water Commission is a member of our permit application advisory review committee and their Water Appropriation Division has suggested that consideration be given to placing six additional ground water monitoring wells at down-gradient locations (north) of the first line of planned mining (Pit 1) in the NE¼ of Section 22, in the NW¼ of Section 21, and south of the section line common to Sections 15 and 16, all within T139N, R98W. These specific locations under the WAPA transmission line would be positioned to place ground water monitoring wells within an undisturbed area that would remain for the life-of-mine and provide valuable ground water data for the first phase (7 years) of proposed mining operations. We concur with the Water Commission's assessment and recommendation and request that SHC commit to placing three nests of ground water monitoring wells in the described locations with completion zones for each nest of wells screened in the D Coal seam and underburden. Installation of the monitoring wells will be required at least one year prior to beginning overburden removal in order to better establish pre-mine baseline water levels and water quality data and flux in these areas. (BEB)
129. Please add to the Monitoring Concurrent with Mining narrative in Section 2.5.4.2 describing the number of wells monitoring each of the identified hydrostratigraphic units within the permit and adjacent area and provide a link in the narrative directing the reader to Figure 2.5-1, Location of Monitoring Wells, Staff Gages, and Seeps and Springs Map. (BEB)
130. Narrative in Section 2.5.4.2 states that an alternate (i.e., reduced) list of wells and/or parameter list may be substituted if warranted and approved by the PSC. Additional narrative should be incorporated into the same paragraph stating SHC's understanding that the PSC also has the regulatory authority to require the installation of additional ground water monitoring wells where deemed necessary and the authority to require additions to the water chemistry parameter list as deemed necessary. NDAC 69-05.2-08-06(2). (BEB)
131. An explanation should be provided in the narrative in Section 2.5 for the radical fluctuation in baseline water level measurements of underburden monitoring wells SHMW-03D and SHMW-07D. Static water level measurements of these wells displays significant water level flux varying by 30-50 feet between some of the measurements, while other underburden monitoring wells display a much more subdued pattern of water level fluctuation. (BEB)
132. Please add to the Reporting narrative of Section 2.5.4.4 of the Ground Water Monitoring Plan by indicating that the Annual Report will also address any impacts or potential impacts to adjacent production wells and springs, any water supply complaints received and subsequent investigations, water replacement issues addressed if necessary, summary of pit water discharges, major mining developments and pit progression, annual precipitation summary, updates of new well and spring certifications or re-certifications, and other information as deemed necessary by the PSC as allowed by NDAC 69-05.2-16-14(4). (BEB)

133. Narrative located within several different subsections of Section 2.5 states that the well and developed spring certification survey program is an ongoing effort and we request that if additional or new information has been acquired since submission of the permit application, that SHC incorporate that new information into the application at this time. (BEB)
134. Please add to the closing sentence of the Ground Water Hydrologic Reclamation Plan, Section 2.5.3.3, in which the statement is made that "Water from the pipeline is a viable alternative to lost ground water supply for residents currently obtaining their drinking water from the pipeline but using ground water for supplemental domestic uses such as lawn watering." While conversion from well water to piped rural water is likely a preferred replacement option for residents that may be impacted, additional explanatory narrative is requested for this statement addressing possible concerns that may arise with associated plumbing costs, potential well decommissioning costs or any other additional costs that may be incurred to a landowner/resident by converting to piped rural water from an existing water supply well. Please provide additional narrative in the section to reinforce SHC's commitment to water supply replacement requirements as defined in NDAC 69-05.2-01-02(90). (BEB)
135. Please provide a link in the Ground Water Monitoring Plan narrative, Section 2.5.4, directing the reader to the Ground Water Monitoring Schedule, Table 2.5-5. Additionally, please specifically list the ground water quality parameters that will be analyzed on an annual basis in the narrative of Section 2.5.4.2, Monitoring Concurrent with Mining. (BEB)
136. Please add to the hydrostratigraphy narrative provided in Section 2.5.2.5 regarding the Overburden – D Coal aquifer. Data analyzed from overburden studies and baseline water level measurements should be utilized in this section to provide a generalized description regarding the occurrence of Study Area ground water determined to be under water table conditions within the overburden hydrostratigraphic unit and/or the occurrence of confined and water table conditions of ground water within the D Coal hydrostratigraphic unit. NDCC 38-14.1-14(1)(r)(9) and NDAC 69-05.2-08-06(1)(c). (BEB)
137. Considering that these are interrelated matters, please provide descriptive narrative and a link in Section 2.5.3.1, Probable Hydrologic Consequences – Impacts to Ground Water Quantity, directing the reader to the Probable Hydrologic Effects of Mining spreadsheet, Table 2.5-4. (BEB)
138. Please address the predicted outcome resulting from proposed mining operations on all seeps/springs (certified and otherwise) within the permit and adjacent areas in the Probable Ground Water Hydrologic Consequences, Section 2.5.3. We have noted that the Probable Hydrologic Effects of Mining, Table 2.5-4 does not appear to provide information on any of the permit-wide or adjacent springs that have been identified and that information should be incorporated into the Probable Hydrologic Effects of Mining spreadsheet as well. NDCC 38-14.1-14-2(i)(1) and NDAC 69-05.2-16-01(1)(a). (BEB)

139. Pursuant to NDAC 69-05.2-08-04(7), please provide information in the permit describing any computer modeling efforts employed by SHC in determination of the ground water probable hydrologic consequences and the results of that modeling, if any. (BEB)
140. Please provide water chemistry narrative derived from water quality analyses data provided in the application regarding the presence of uranium in the monitored aquifers into Section 2.5.2.7. In the narrative, please provide and discuss background levels as a basis of comparison with measured Study Area uranium concentration of the various hydrostratigraphic units and aquifers. (BEB)

Section 2.5 - Ground Water Hydrology Tables

141. The List of Tables, Table 2.5-2A as well as the table heading is labeled as Well Monitoring Locations and should be changed to denote Monitoring Well Locations to more accurately describe the content of the table. This change to the table heading is not required, but suggested. (BEB)
142. In addition to the other pertinent location and elevation information provided in Table 2.5-2A, please incorporate the depth and/or elevation of the top and bottom of the screened intervals into the spreadsheet for each of the monitoring wells. (BEB)
143. The Water Appropriation Division of the State Water Commission has suggested that pertinent information regarding the completed Well Survey Packets, Appendix B, be placed in a spreadsheet format similar to the information that is currently provided in Table 2.5-2A for ground water monitoring wells. We concur with their suggestion and ask that you comply with the request so that the information provided in the application is readily accessible. (BEB)
144. Please symbolize (provide shading) on the Ground Water Monitoring Schedule of Table 2.5-5 that monitoring wells SHMW-03HTB and SHMW-08HTB were sampled for baseline water quality in November 2009 to corroborate with water quality information that is provided in Table 2.5-6-1 of Appendix 2.5-6, and lists the water quality data for these wells that were sampled on November 29, 2009. (BEB)
145. Please update permit application information regarding the most recently installed ground water monitoring wells SHMW-03HTB and SHMW-08HTB with additional water level measurement data obtained between the 3rd quarter 2009 and present. Additional water level measurement data should be reflected in the Ground Water Monitoring Schedule, Table 2.5-5, as well as Water Levels and Seep and Spring Flows, Appendix 2.5-4. NDAC 69-05.2-08-06(1)(d). (BEB)
146. We have noted some discrepancies regarding information provided in the application for several of the ground water monitoring wells. SHMW-15A2 is listed in the Ground Water Monitoring Schedule of Table 2.5-5 as being screened in underburden while the Water Levels and Seep and Spring Flows of Appendix 2.5-4 lists the screened unit as overburden. Additionally, ground water monitoring well SHMW-15S

is listed in the Ground Water Monitoring Schedule of Table 2.5-5 as being screened in underburden and is listed as being screened in overburden in the Water Levels and Seep and Spring flows of Appendix 2.5-5. The Monitoring Well Borehole and Construction Summary of Appendix 2.5-1 denotes the screened unit of SHMW-15S as being 28.6 feet to 33.3 feet below surface which, according to the Monitoring Well Lithologic Boring Logs of Appendix 2.5-2 would place the screened zone in a coal seam at a depth of 29-35 feet below surface and according to the structure contour map provided in Figure 2.3-12 correlates with the elevation of the D Coal seam. Please address these discrepancies. (BEB)

147. The screened unit for SHMW-10D1 is listed as underburden in the Summary of Field Derived Aquifer Properties, Table 2.5-5-1, and it appears the screened unit listing for this well should be changed to HT Butte Coal. Please review and update as necessary. (BEB)

Section 2.5 – Ground Water Hydrology Figures

148. Review of the HT Butte Coal Potentiometric Surface Map, Figure 2.5-4, indicates the water level elevation of ground water monitoring well SHMW-08HTB is labeled as being 2,473 feet (msl); however, the only water level elevation provided in the permit for this well in Appendix 2.5-4 depicts a measured water level elevation of 2,468 feet. If updated water level data was utilized in development of the potentiometric contours provided on the map, please apprise us of that information and incorporate the data into the application. If water elevation data utilized in development of the potentiometric surface map for SHMW-08HTB was generated from the single water level measurement that is currently provided in the permit, the prevailing hydraulic gradient associated with this hydrostratigraphic unit within the permit and adjacent area will likely change from that which represents a northeasterly flow component to a more northwesterly flow component and hence, the Potentiometric Surface Map will need to be updated. Please address. (BEB)
149. Now that the data is available and considering the importance of the HT Butte Coal hydrostratigraphic unit in the ground water monitoring plan, please incorporate information generated from the lithologic logs and the geophysical logs obtained from ground water monitoring well SHMW-08HTB that was drilled in the W $\frac{1}{2}$ of Section 21 to extrapolate the occurrence and elevation of the HT Butte coal seam on the A-A' cross-section of the Geologic Cross-Sections Map in Figure 2.5-2. Narrative that is provided in Section 2.3.2.3 regarding the 2009 drilling program for installation of the HT Butte monitoring well at this location will need to be updated. Additionally, where encountered and identified, please label the E1 and E coal seams on the Cross-Section Maps as well. NDCC 38-14.1-14(r)(3) and NDAC 69-05.2-08-05(2)(e). (BEB)
150. Figure 2.5-8-1 provides location information for permit and adjacent area certified wells and springs; however, the locations of developed springs SHSS-16, SHSS-17A, and SHSS-17ST are not provided on the map. Please add the locations of these developed/certified springs on the map in addition to any other springs that were

certified in the approximate 2-mile radius surrounding the Permit Area. Please provide a separate symbol for certified springs on the map and in the map legend so that they can be readily differentiated from the certified wells. (BEB)

Section 2.5 – Ground Water Hydrology Appendices

151. Narrative in Water Quality Data for Seeps and Springs, Appendix 2.5-6, describes severely degraded water quality issues discovered during baseline data collection and sampling of water from seep/spring SHSS-20. Positioned very close to SHSS-20 is seep/spring SHSS-20A and continuing narrative regarding the springs describes that the apparent owner/landowner of these springs has requested the site no longer be sampled. We also noted that the springs are located outside of the proposed Permit Area in the NE¼ of Section 20, but within the Study Area and based on the elevation and topography of the spring locations that are located only about 500 feet south of the proposed Permit Boundary, it is apparent from review of the site specific topographic relief that spring discharge flow paths are to the north with confluence with the West Tributary in the SE¼ of Section 17. Considering the potential for surface water and ground water degradation issues from the spring/seep sources to areas within the proposed Permit Area, we request that additional narrative be added to this section describing the measures to be taken to comply with the requirements of NDAC 69-05.2-09-12(1)(b) regarding control of surface and ground water drainage into, through, and out of the Permit Area. (BEB)
152. Narrative in Section 1.0, Introduction of the Well Certification Narrative of Appendix 2.5-8 of the Well Certification Program, indicates that the well/spring certification survey was developed by SHC in conjunction with the North Dakota Public Service Commission, etc. Please replace the word conjunction with the word consultation because the role that the PSC provided during the pre-mine well certification process was limited to advisory only. (BEB)
153. Spring flow data and water quality information is provided in the permit in Section 2.5; however, we have been unable to locate field certification forms for the identified developed springs. Please provide copies of the certification forms in the application if they exist separately from the other spring data that is provided. (BEB)
154. Please describe in the aquifer testing narrative, Appendix 2.5-5, the rationale for determination of the 20, 30, and 40 foot aquifer/saturated thickness values (b) in determination of transmissivity of the hydrostratigraphic units as provided in Table 2.5-5-1. (BEB)
155. In an effort to more clearly represent the Permit Area hydrostratigraphy, the water level hydrographs provided in Appendix 2.5-4 need to be updated with symbology, labeling, and appropriately scaled to depict the top and bottom screened interval elevations of each of the monitoring wells along with a graphic representation of approximate ground surface elevation at the monitoring nests. (BEB)

156. The hydrograph representing water levels of nested ground water monitoring wells in the SHMW-15 series needs to be updated. Monitoring wells SHMW-15A2 and SHMW-15S have the same symbology associated with them, and a different symbol for one or the other should be incorporated into the diagram. Separately, due to the fact that water levels representing elevations of SHMW-15A1 and staff gage SHSG-15 overlap and intermingle on this graph and possibly others, although not required, the incorporation of colored symbols and the lines connecting the water levels would add to the utility of the diagrams. (BEB)

Section 2.6 – Surface Water Information

157. Please revise the code reference to Chapter 33-16-02.1 administered by the North Dakota Department of Health to read “Administrative” rather than “Century” in the second paragraph of Section 2.6.4 - Surface Water Quality. (WTG)
158. It appears that the laboratory pH range and average values summarized for site names SHHR-01 and SHHR-02 for the Heart River in Section 2.6.4.3 - Study Area Surface Water Quality (page 19) are erroneous based on a comparison with the data summarized in Table 2.6-15 - Surface Water Quality Data. Please review and revise as necessary. (WTG)
159. It appears that the TSS concentration ranges summarized for reservoirs and ponds in Section 2.6.4.3 - Study Area Surface Water Quality (page 21) were copied from the TDS concentration ranges summarized in the previous sentence, and they are erroneous based on a comparison with the data summarized in Table 2.6-15 - Surface Water Quality Data. Please review and revise as necessary. (WTG)
160. Please correct the spelling error (materials) in the third paragraph of page 26 in Section 2.6.5.2 - Effects of Mining and Reclamation Operations on Surface Water Quality. (WTG)
161. As required by NDAC 69-05.2-16-05, please specifically reference the surface water monitoring sites (they appear to be those in Table 2.6-14), describe the figure on which the sites are depicted (Figure 2.6-9), and describe the proposed monitoring frequencies in Section 2.6.5.5.2 - Monitoring Concurrent with Mining. (WTG)
162. Please revise the narrative in the first paragraph on page 30 of Section 2.6.5.5.2 - Monitoring Concurrent with Mining, to clarify that point source discharges (sedimentation ponds) are regulated by a NDPDES permit, but stream and reservoir monitoring (runoff) is regulated by the PSC rather than the NDPDES permit. (WTG)

Section 2.6 – Surface Water Information Tables

163. Please define the figure (Figure 2.6-6A or 2.6-6B) that is referenced on Table 2.6-9, Primary Study Area Gaging Station Selection Criteria, in Criteria No. 5. (WTG)

164. It appears that the surface water quality data summaries for site names SHHR-01 and SHHR-02 are in reverse order in Table 2.6-15 - Surface Water Quality Data based on a comparison with site water quality data in Appendix 2.6-4 - Surface Water Quality Results. The apparent error was noticed because a statement regarding upstream and downstream TSS concentrations of the Heart River in Section 2.6.4.3 - Study Area Surface Water Quality (page 19) contradicts the data summarized in Table 2.6-15. Please review and revise as necessary. (WTG)

Section 2.6 – Surface Water Information Figures

165. Pursuant to NDAC 69-05.2-08-07(1)(b), please provide a map that shows and specifically labels the ephemeral, intermittent, and perennial streams within the proposed permit and adjacent areas. The Overview of Surface Water Study Areas Map, Figure 2.6-1, would be an appropriately scaled map to provide this information. (BEB)
166. The bridge in Table 2.6-3 is labeled as B-23, and it is shown in Figure 2.6-5 as SHB-23. Please correct this discrepancy. (MSK)
167. It appears that the catchment area boundary for surface water gaging station SHSB-03A is missing from Figure 2.6-6A - Surface Water Contributing Watersheds Sheet 1. Please review and correct as necessary. (WTG)
168. It appears that the catchment area boundary for surface water gaging station SHSB-03A, and the gaging station location and label, are missing from Figure 2.6-6B - Surface Water Contributing Watersheds Sheet 2. Please review and correct as necessary. (WTG)
169. It appears that the legend line colors for the 90% Exceedence line and the 10% Exceedence line may be reversed on Figure 2.6-7 - Heart River near South Heart (USGS Gage #06343000) Mean Daily Flow Hydrograph and Flow Exceedence Probabilities, Period of Record from July 1, 1946, to September 30, 1984. Please review and correct as necessary. (WTG)
170. Please add the location symbol and label for surface water gaging station SHSB-03A to Figure 2.6-9 - Surface Water Quality Monitoring Locations, and edit the symbol for SHSB-03 on the same figure. According to the Section 2.6 narrative describing flow for the South Branch Heart River on page 12 of Section 2.6.3.2 - Surface Water Gaging Stations, site SHSB-03A was established 1.8 miles downstream of site SHSB-03 in March 2008 because flow measurements for SHSB-03 may have been impacted by a beaver pond. We understand, and the permit data indicates, that site SHSB-03 will remain in use for monitoring surface water quality, but site SHSB-03A will be used for monitoring surface water quantity. The location symbol for site SHSB-03 should therefore be changed to a blue-filled triangle representing a surface water quality monitoring site, and a black-centered blue circle should represent the location for surface water gaging station SHSB-03A. (WTG)

Section 2.6 – Surface Water Information Appendices

171. The remarks on the hydrograph for Gaging Station SHSB-03 in Appendix 2.6-1 - Seasonal Variation for Surface Water Quantity within the Primary Study Area (page 16) appear to be truncated. Please review and correct as necessary. (WTG)
172. Please revise the title on each sheet of Appendix 2.6-4 - Surface Water Quality Results to name the document correctly. As currently presented, the appendix is incorrectly titled as Attachment B on each of the 21 sheets. (WTG)
173. As required by NDAC 69-05.2-08-07(3)(b), please create a new appendix to Section 2.6 - Surface Water Information that contains copies of all of the laboratory analysis reports for the surface water quality samples summarized in Appendix 2.6-4 - Surface Water Quality Results. Although the analysis summary tables provided are useful, the laboratory analysis reports allow a more detailed review of specific sample locations and sample dates. There is no need to hyperlink the new appendix anywhere in Section 2.6. (WTG)

Section 2.7.1 – Pre-Mining Land Use

174. In the woodlands narrative on page 11 of Section 2.7.1.4.8, please clarify if low shrub species (i.e. western snowberry) not associated with trees or tall shrubs were considered woodlands. Typically, low shrubs that are not associated with tall shrubs or trees are included with native grassland and not considered woodland. (GAW)
175. Please include the legal description of the tract of land that is enrolled in the ND Game and Fish Department CoverLocks Program in the second paragraph of Section 2.7.1.5.2, Conservation Uses. NDAC 69-05.2-05-02(1). (GAW)
176. Section 2.7.1.5.5 indicates all structures located within one-half mile of the permit boundary (not previously discussed) are shown on Figures 2.7.1-2A, 2.7.1-2B, and 2.7.1-2C. However, features located in the SW¼ of the NE¼ and the W½ of the NW¼ of Section 20 are not clearly identified on Figure 2.7.1-2A and there is no information about their current use. Please provide the necessary information. NDAC 69-05.2-08-02(f). (GAW)
177. Since most of the long-term yields provided in Table 2.7.1-3 are not based on 30 years of data, please change the phrase "...30-year average..." in the second paragraph to "...multi-year average..." (SAS)
178. The reference to Appendix 2.7.1-2 in the last sentence in the third paragraph should actually be to Appendix 2.7.1-1 in order to evaluate potential productivity by landowner. Appendix 2.7.1-2 deals with land management issues by landowner. Please correct as necessary. (SAS)

Section 2.7 – Pre-Mining Land Use Tables

179. Please include legal descriptions to the nearest quarter-quarter section in Table 2.7.1-8. The easting and northing values listed are not descriptive without geo-pdf's or other appropriate software. NDAC 69-05.2-05-02(1). (GAW)
180. Table 2.7.1-1 includes a land use labeled "native vegetation". It is assumed that this is native grassland. Please clarify as necessary. (GAW)
181. Table 2.7.1-1, Pre-Mine Land Use Acreage within the Permit Boundary indicates there are 32.5 acres of wetlands and 14.1 acres of developed water resources. Table 2.3-1, Wetland Acreage by Landowner and Wetland Mapping Unit – Permit Area, indicates there are 56.53 acres of wetlands in the permit area and this acreage includes developed water resources and temporary wetlands (19.15 acres) that are identified but not classified separately from the adjacent land use. It is not clear how the value 32.5 acres was calculated given the information listed in both tables. Please review and update as necessary to provide clarification. (GAW)
182. Table 2.7.1-4 is being used to demonstrate the average long-term small grain production by soil series through the use of productivity indices. However, the way the data is presented by the map unit name may be misleading. Please make the following corrections/additions to the table:
 - a. Although a footnote for the PI column indicates that the "...dominant/average slope..." is being used, anyone looking at the data would not know what slope phase the PI value was based upon. Please list only the slope phase upon which the yield estimations are being calculated.
 - b. Channeled soils are to be given a PI value of 20 according to the cited reference (NDPSC 2003) on page II-C-7 (this would apply to the CHAN and HL-A ch map units).
 - c. Please separately list the soil series names and calculations for those soils currently classified in the map unit column as Entic Haplustolls, fluvents and wet saline or give a percentage to each soil series within that soil mapping unit and develop a weighted PI value based upon the percentage for each individual soil series.
 - d. The Lawler silty clay soil with a B slope should have a PI value of 76, not 80.
 - e. The Havrelon saline/sodic substratum soil has been assigned a PI value of 68 which would be for slightly saline substratum. Otherwise, moderately saline substratum should be assigned a value of 42, or if strongly saline, a value of 13. If slightly saline is the correct description, please indicate that.
 - f. If the Lallie soil is drained, it should be given a PI value of 45, if undrained than the value of 25 would be correct.

- g. A Morton loam with an A slope should have a PI of 85, not 80. And,
- h. If salinity is slight then a value of 68 should be applied to the Shambo saline/sodic substratum soil otherwise values of 42 or 13 for moderate or strongly saline. (SAS)

Section 2.7 – Pre-Mining Land Use Appendices

- 183. The legal description for the Emmil Family Trust land in the “Summary of Pre-Mining Land Use Acreage and Soil Mapping Unit Information by Landowner within the Permit Boundary”, Appendix 2.7.1-1.2, includes tracts located outside of the proposed permit boundary. Wording above the legal description states that only “Portions of Sections within Permit Boundary”; however, this is asterisked to note that ownership may not be the same for portions outside of the Permit Boundary. This is confusing when tracts of lands are listed that are not being permitted, e.g., the SE¼ of Section 33 and the SW¼ of Section 34. Please edit the legal descriptions to include only tracts of lands included within the proposed permit boundary as stated in the appendix heading. Similarly, the legal description for Glen Wagner’s land, Appendix 2.7.1-1.14, is all of Section 29, but only 0.2 of an acre of land located in the NE¼NE¼NE¼ of Section 29 is included in the permit boundary. The legal description for this tract should be revised to only reflect the area within the permit boundary. NDAC 69-05.2-05-02(1). (GAW)
- 184. The last pages of Appendices 2.7.1-1.12 and 2.7.1-1.13 refer the reader to Table 2.4-5 for map unit descriptions. It is not clear why only these two appendices refer the reader to this table. Please clarify. NDAC 69-05.2-05-02(1) (GAW)
- 185. The Summary of Pre-Mining Land Use Acreage and Soil Mapping Unit Information by Landowner within the Permit Boundary for the Leocadia Emmil Family Trust, Appendix 2.7.1-1.2, indicates that there are 1.7 acres of woodlands located in this tract but it appears there are very few trees in this area. Please review and update as necessary. (GAW)
- 186. The Summary of Pre-Mining Land Use Acreage and Soil Mapping Unit Information by Landowner within the Permit Boundary for Mary Louise Peters et.al., Appendix 2.7.1-1.10, indicates that there are 47.1 acres of Tame Pastureland – Woodland in this tract but it appears there are few if any trees or shrubs in this tract. Please review and clarify as necessary. (GAW)

Section 2.7.2 – Pre-Mining Vegetation

- 187. In the productivity subsection of the Quantitative Inventory narrative in Section 2.7.2.2.3, please clarify if the total estimated annual yield values provided in the Tables in 2.7.2-3 were adjusted to compensate for utilization levels (less than 50%) and if NRCS growth curves were used in any instances to adjust for growing season conditions. We realize that productivity sampling was completed in late August and

September so growth curve adjustments were probably not necessary but this should be discussed to provide clarity. NDAC 69-05.2-05-02(1). (GAW)

188. The native grassland ecological site summary descriptions in Section 2.7.2.3.2 (pages 15 – 34) make reference to the site being in excellent, good, fair or poor condition as was done with the range site ratings. Since condition ratings are not officially assigned to ecological similarity index rankings, please clarify in the narratives on pages 11 and 14 of Section 2.7.2.3.2 how the condition scores listed were determined for the purposes of this evaluation. (GAW)
189. The productivity subsection of the Quantitative Inventory narrative in Section 2.7.2.2.3 states that quarter-meter square quadrants were clipped to estimate above ground production. However, the yield values in the Tables in 2.7.2-3 are converted to pounds per acre and the values listed in the tables in Appendix C are given as grams per meter squared. Please include the conversion factors to convert from quarter-meter square to square meter to lbs per acre so that the values listed in the various tables can be calculated and verified. (GAW)
190. In Section 2.7.2-1, Ecological Site and Vegetation Type Descriptions, please explain how the mean percent canopy cover (ocular estimation) values listed in the tables in each of the ecological site descriptions were calculated. It appears that the values were determined from the tables in Appendix B, but the values listed cannot be confirmed. Please explain and document how the percent cover values in these tables were determined. NDAC 69-05.2-08-08. (GAW)
191. A sentence in the second paragraph on page 42 of Section 2.7.2.4, Summary of Vegetation Resources within the Permit Boundary, states that ecological condition was calculated using cover data for sites that were heavily grazed and unsuitable for clipping. Please further explain how this was done as a range condition and similarity index values can only be computed using production data and indicate where the results are listed. It does not appear that any of the tables, charts or appendices includes an assessment of range condition or similarity index values determined from cover values. Please review and provide the necessary information. NDAC 69-05.2-08-08(1)(d). (GAW)
192. Please include a narrative interpretation of the results of Table 2.7.2-2, Summary of Point-Intercept Cover Data for Ecological Sites..., and how Table 2.7.2-2 was created from the data in Appendix E in addition to the explanation provided in the footnotes listed at the bottom of the first page of Appendix E. NDAC 69-05.2-05-02(1). (GAW)
193. The native grassland discussion on page 43 of Section 2.7.2.4, Summary of Vegetation Resources within the Permit Boundary, mentions that there were 7 plant communities in the thin claypan ecological site and 4 in the clayey site. The language on page 43 states that there are 7 plant communities on the thin claypan site, but that they are collectively dominated with the same species. It is not then clear what distinguishes these plant communities from each other. The corresponding ecological site

descriptions do not clearly identify these plant communities. Please edit to clearly describe these plant communities or otherwise edit for clarity and consistency. NDAC 69-05.2-05-02(1). (GAW)

194. The acreages listed for each land use in narratives in Section 2.7.2.4, Summary of Vegetation Resources within the Permit Boundary, are different than that which is shown in Table 2.7.1-1, Pre-Mine Land Use Acreage within the Permit Boundary. For example, the narrative indicates there are 3,104 acres of cropland, 603 acres of native vegetation, 275 acres of tame pastureland, 51 acres of wetland and 309 acres of woodland but Table 2.7.1-1 indicates there are 3,089.3, 596.4, 216.3, 32.5 and 296 acres of these land uses respectively. Please review and correct these discrepancies as necessary. NDAC 69-05.2-05-02(1). (GAW)
195. In the shelterbelt discussion in Section 2.7.2.3.4, please mention that shelterbelts SB-02, SB-07, SB-14, SB-15 and part of SB-12 are located outside of the proposed permit boundary and state how many acres of shelterbelts are in the proposed permit area. It is recommended that Table 2.7.2-8 be revised to clarify which shelterbelts are within the permit and which are located outside of the proposed permit boundary. NDAC 69-05.2-05-02(1). (GAW)
196. Field bindweed (*Convolvulus arvensis*) is incorrectly identified as a State-listed noxious weed in Section 2.7.2.3.9 and again on page 46 of Section 2.7.2.4. Please correct this error. (GAW)
197. Much of the information included in the Appendices portion of Section 2.7.2 is labeled as "Tables" rather than "Appendices". This is very confusing when printed or viewed given that Section 2.7.2 also has a "Tables" section. Please label all of the tables in the Appendices section of the permit as Appendices. NDAC 69-05.2-05-02(1). (GAW)
198. Please include the NRCS description of each native grassland ecological site present within the vegetation study area. This should be included in the permit as reference material. NDAC 69-05.2-08-08(1)(c). (GAW)

Section 2.9 – Fish and Wildlife Resources Narrative

199. In the Endangered or Threatened Species subsections, Sections 2.9.1.2.3 and 2.9.1.3.4, please include a discussion about the species that are classified as Candidate species to the Threatened and Endangered species list. Discuss if any of these species (Dakota skipper, Greater sage-grouse or Sprague's Pipet) were sighted in the study or permit area and if the proposed permit area contains suitable habitat for any of these species. The narrative in Section 2.9.2.2 should also be updated to address listed Candidate species. (GAW)
200. Please revise Section 2.9, Fish and Wildlife Resources, to indicate that Section 2.6.4 of the permit contains additional information regarding the classification of the streams within the permit area and an assessment of their water quality. (GAW)

201. Please revise the Fish and Wildlife Monitoring Plan, Section 2.9.3, to discuss that the results of surface water monitoring in the South Branch of the Hear River (Site SHSB-01) and the Heart River (Site SHHR-02) will be evaluated to determine if water quality and quantity changes are occurring that may be detrimental to aquatic invertebrates, mussels and fish, or to downstream fisheries. (GAW)
202. Please update Section 2.9.2.2 to specifically address if SHC is going to completely avoid all stream channels in the permit areas, or if any streams will be affected. Address how SHC will use the best technology currently available to provide protection to streams as required by NDAC 69-05.2-13-08(6)(f) and compliance with NDAC 69-05.2-16-20 and NDAC 69-05.2-16-07. (GAW)
203. Please expand the discussion in Section 2.9.2.2 to further clarify how the mine plan has been designed to minimize direct impacts to the most important habitat in the permit area, deciduous streambank, and aquatic habitats. The mine plan should be reviewed and specifics such as the disturbance acreage to each of these habitats should be provided. It appears that Ponds 7, 9, 11 and the one located on the section line between Sections 22 and 27 will be impacting deciduous streambank habitat and that about 11 acres of this habitat will be affected by pits in the northwest corner of Section 27 and about 8 acres with construction of the haul road. This section of the permit should discuss why it is not feasible to place these ponds and haul roads beyond the deciduous streambank habitat type, and justification of the disturbance planned to this habitat in the northwest corner of Section 27 where coal removal is planned on only a portion of this area. Alternative considerations should be discussed. It appears that the haul road crossing over the South Branch of the Heart River could be located in Section 28 rather than Section 27 to minimize disturbance to deciduous streambank habitat. Please justify using this location and discuss the alternatives considered. NDAC 69-05.2-13-09(6)(a). (GAW)
204. Please edit the third paragraph on page 2.9.2.2 to clarify if any active or inactive raptor nests are located within the planned disturbance boundary and provide an assessment of the proximity of mining disturbances to known active and inactive raptor nests. (GAW)
205. Please revise the Section 2.9.2.3, Reclamation and Enhancement of Fish and Wildlife Resources, to detail the reclamation and enhancement measures that will be used rather than simply referencing other sections of the permit as required by NDAC 69-05.2-09-17. (GAW)
206. Please include a discussion about how SHC complied with NDAC 69-05.2-09-17(e), which requires that SHC consult with the ND Game and Fish Department before selecting indicator species for monitoring with the Fish and Wildlife Monitoring Plan. (GAW)

207. The Wildlife subsection of Section 4.3.6.5, Wetlands, mentions that waterfowl brood and pair counts, shorebird use, etc. will be recorded on reclaimed wetlands during the last three years of the wetland revegetation responsibility. Please update the Fish and Wildlife Monitoring Plan accordingly. (GAW)

Section 2.10 – Wetlands

208. Page 1 of Section 2.10.2, Post-Mining Wetlands, incorrectly implies that there are only minor differences between pre- and post-mining wetland acreages and that the difference is based in part on landowner preference statements. Please correct this error. (GAW)
209. The narrative on page 1 of Section 2.10.2 and Table 4.1-3 indicates that saturated wetlands will be recreated. The pre-mine saturated wetlands were saline seeps. Please revise to explain how post-mining saturated wetlands will be re-created if the ground water is affected by mining activities. (GAW)
210. Many of the Location IDs listed in the first column of Table 2.4-1 cannot be found on Exhibits 1A, 1B, and 1C appendices of Section 2.10-1, Pre-mining Wetland Report, and many more water quality sampling locations are shown on the maps than listed on Table 2.4-1. It is very difficult to read the wetland sampling location numbers on Exhibits 1A, 1B, and 1C given the font color and that the topographic elevation lines are identified in black on the exhibits. Please review and update to ensure the wetlands listed in the table are clearly shown on the corresponding exhibits. (GAW)
211. Figure 2.5-1, Locations of Monitoring Wells, Staff Gages, and Seeps and Springs, depicts seeps or springs in the N½ of the SE¼ of Section 17 and SE¼ of Section 27 that are not identified as wetlands. Appendix 2.5-4 indicates that these springs or seeps were always dry. Please discuss this issue in Appendix 2.10-1, Pre-mining Wetland Narrative and explain why springs or seeps identified in Section 2.5 would not be considered wetlands. (GAW)
212. Please insert an appendix title either on page i or page 1 of Appendix 2.10-1 - Pre-mining Wetland Report. As currently presented, the appendix title can only be inferred from the Navigation Pane. (WTG)

Section 3.1 – Operation Plan - General

213. Please revise the first sentence on page 2 of Section 3.1.1.1 to replace the phrase “Overburden/topsoil” with “Topsoil, subsoil, and overburden”, and revise the last sentence of the same section on page 3 to add subsoil to the phrase “overburden, topsoil and lignite removal.” (WTG)
214. The Introduction to Operation Description narrative on page 3 of Section 3.1.1.1 references and provides a link to Table 3.1-2 for the estimated annual lignite production from two recoverable lignite seams over the life of the mine; however,

Table 3.1-2 lists three coal seams (E, E1, and D) for which production estimates are based. Please correct this discrepancy. (BEB)

215. In the Operation Description Narrative, Section 3.1.1, please clarify if the Life of Mine Overburden and Lignite Removal Schedule Map, Figure 3.1-2, also functions as the Extended Mine Plan Map thus fulfilling the requirements of NDCC 38-14.1-15, NDAC 69-05.2-07-03, and NDAC 69-05.2-08-02(2). Otherwise an Extended Mine Plan Map with the information required by NDAC 69-05.2-07-03 must be included in the application. (GAW)
216. In Section 3.1.1.1 Introduction, the coal production values do not correspond with those listed in Table 3.1-2. Please update accordingly. (MDB)
217. On page 7 of Section 3.1.2.2, Haul Roads, coal crushing is listed as part of the general mining sequence; however, Section 3.1.2.5 states the coal crushing facility will occur at the plant facility which is not part of the mining permit. Please correct the discrepancy. (MDB)
218. Please revise and clarify the narratives describing haul road construction of subsoil on page 6 of Section 3.1.2.2 - Haul Roads. The Reclamation Division has historically approved the use of subsoil as a haul road base in other mine permits on a case by case basis. The approval is typically limited to those permits where large quantities of good quality glacial till subsoil exists across a relatively homogeneous till plain landscape and the annual soil handling plans demonstrate a large subsoil surplus. Neither of the aforementioned criteria exists at the South Heart Lignite Mine. To the contrary, the projected permit subsoil surplus or deficit remains unknown (see deficiencies in Section 3.1.2.3) and the haul road routes traverse a landscape of weathered bedrock and alluvium with widely varying subsoil quality. The proposal to build haul roads from subsoil will not be approved, and all references to the proposal must be removed from the permit. As required by NDAC 69-05.2-15-02(1), all subsoil identified by the soil survey must be salvaged from the haul road routes prior to haul road construction. (WTG)
219. As required by NDAC 69-05.2-24-07-1(d), please include a statement in the last paragraph on page 6 of Section 3.1.2.2 - Haul Roads, that roadbeds will be ripped, plowed, and scarified during haul road reclamation. (WTG & MSK)
220. Please revise and clarify the narrative describing subsoil removal for construction of haul roads in the first paragraph on page 7 of Section 3.1.2.2 - Haul Roads. As required by NDAC 69-05.2-15-02, and noted in related deficiencies that the projected permit subsoil surplus or deficit remains unknown, all subsoil identified by the soil survey must be salvaged from haul road routes prior to haul road construction. We will allow SHC to construct pond embankments out of subsoil so long as they are constructed out of subsoil from within the pool area of the respective pond. However, if it is necessary to excavate the pool area beyond the inventoried subsoil depth and into the underlying overburden, it will be necessary to segregate the overburden from

the subsoil. In other words, SHC must ensure that an adequate volume of subsoil exists within the pool area to construct the embankment. (WTG)

221. Section 3.1.2.3 - Topsoil Removal, and Section 4.1.1.1 - Topsoil and Subsoil Removal, each contain narratives for the removal, storage, and redistribution of suitable plant growth material as required by NDAC 69-05.2-09-11(5). We recommend that these two sections be revised, merged, and renamed something like a "Soils Handling Plan" and placed in Section 3.0 to improve the permit's clarity and continuity. We recommend that Section 4.1.1.1 as currently presented be removed from the permit after the relevant sections have been revised and merged with Section 3.1.2.3. The following items refer to narratives in Section 3.1.2.3 and Section 4.1.1.1, as well as the related tables and figures, because much of the information in the two sections is duplicative, incomplete, or incorrect.
- a. As required by NDAC 69-05.2-09-11(5), please expand the soils handling plan narrative to describe how equipment operators will use observations of soil properties to aid in accurate topsoil and subsoil (collectively termed suitable plant growth material, or SPGM) removal as discussed in Policy Memorandum No. 5. Although the salvage thicknesses listed for soil map units on soil survey maps will be the primary guide for removing all available SPGM, soil properties can change rapidly over short distances. Equipment operators will need to be alert for changing soil conditions, particularly in the South Heart Lignite Mine permit area where soil salinity and sodicity are known to be factors limiting the depth of SPGM salvage. (WTG & MSK)
 - b. As required by NDAC 69-05.2-09-11(5), please expand the soils handling plan narrative to describe how equipment operators will use data from the 678 soil map unit observation points within the mine pit boundaries to aid in accurate SPGM removal operations. These observation points were taken by the soil surveyor to define topsoil and subsoil salvage thicknesses for all map unit delineations. The data collected at each point includes spatial coordinates, map unit series component, topsoil thickness, subsoil thickness, and salvage thickness limiting factors such as salinity, sodicity, or bedrock. The observation point data is unique to the South Heart Lignite Mine permit and represents a valuable data resource that should be used during SPGM removal operations. Mining permits typically use a 200 foot grid for SPGM removal monuments that are retained for PSC inspection. The salvage thicknesses written on grid stakes typically represent the average soil map unit salvage thickness across the soil survey area, and it may vary significantly from what is exposed on the monument. In contrast, the South Heart Lignite Mine soil map unit observation points are site-specific observations that should be used with mining equipment spatial data software to train equipment operators for accurate SPGM removal operations. It appears that the observation points are often within 400 feet of each other, but much more widely spaced in some pit locations. Although a 200 foot grid for SPGM removal monuments will be necessary for PSC inspection, all of the soil map unit observation points should be included in the grid and be retained as SPGM removal monuments. (WTG)

- c. The second paragraph of Section 3.1.2.3 on page 7 states that two methods were used to estimate soil respread thickness. We are unfamiliar with the gridded model described as method 1. Please remove all references to the gridded model in the soils handling plan narrative because the only acceptable methods to determine projected suitable plant growth material respread thickness are referenced in Policy Memorandum No. 17. (WTG)
- d. Table 3.1-5, Suitable Growth Material Balance by Landowner - Life of Mine, is referenced and hyperlinked on pages 7 and 8 of Section 3.1.2.3 and on page 2 of Section 4.1.1.1, but there is only a short description of what the table shows or how it was developed. As required by NDAC 69-05.2-05(02) and 69-05.2-09-11(5), please expand the soils handling plan narrative to describe what the table shows (SPGM volumes for each landowner tract within the permit area) and how the table was developed (calculations of soil map unit acreage and SPGM salvage thicknesses for each landowner tract). There should be no mention of other suitable strata (incorrectly termed "suitable overburden" in the narrative as presented) related to Table 3.1-5 unless other suitable strata will be defined according to NDAC 69-05.2-08-11 and 69-05.2-15-02-5 (see related deficiency on other suitable strata). (WTG)
- e. Please revise and simplify Table 3.1-5 as follows:
 - (1) Remove the year of mining columns because the SPGM volume balances are tracked in annual soil handling plans;
 - (2) Create table columns for tract number, landowner, projected disturbed acres, projected respread thickness (inches), required respread volume (yds³), available topsoil (yds³), available subsoil (yds³), total available SPGM (yds³), and surplus/deficit (yds³);
 - (3) Create rows for each ownership tract in the permit area and calculate the quantities for each column except for tracts listed with 0 projected disturbed acres;
 - (4) Create a footnote and hyperlink for the tract column explaining that the tracts are shown in Figure 1.3-2;
 - (5) Create a footnote and hyperlink for the projected respread thickness column explaining that the projected respread thickness was calculated by Method 2 of Policy Memorandum No. 17 and respread thicknesses are shown in Figure 4.1-10a;
 - (6) Calculate the average of the projected respread thickness column;
 - (7) Calculate the totals of the required respread volume and total available SPGM columns to determine the permit SPGM surplus or deficit; and,
 - (8) Remove any entries for available suitable overburden volume or thickness because none has been defined according to NDAC 69-05.2-08-11 and 69-05.2-15-02(5) - (see related deficiency on other suitable strata). (WTG)
- f. Page 8 of Section 3.1.2.3 and page 1 of Section 4.1.1.1 indicate that Policy Memorandum No. 17 was used to determine projected suitable plant growth material respread thicknesses. Please revise the soils handling plan narrative with regard to projected suitable plant growth material respread thicknesses as follows:

- (1) The reference to the number of boreholes should be reduced to 75 because that is the approximate number within the mine pit boundaries;
 - (2) Remove the reference and hyperlink to Figure 4.1-10b because it does not apply to the narrative;
 - (3) At your discretion, remove the reference and hyperlink to Table 4.1-1 (see related deficiency);
 - (4) Remove the reference to sodic spoil in Policy Memorandum No. 3 because the nontoxic cover requirement is met if the SPGM respread thickness is based on graded spoil characteristics;
 - (5) Remove the reference to the 42 inch SPGM respread thickness because it was removed from NDAC 69-05.2-15 in 1999;
 - (6) Add a reference and hyperlink to Table 3.1-5 when describing the average SPGM respread thickness and SPGM deficit for the permit area;
 - (7) Remove the reference to 2.2 million cubic yards of suitable subsoil or overburden because none has been defined according to NDAC 69-05.2-08-11 and 69-05.2-15-02-5 (see related deficiency on other suitable strata);
 - (8) Remove the reference and hyperlink to Table 4.1-2 and also remove Table 4.1-2 from the permit because average EC and SAR values are not used to determine SPGM respread thickness; and,
 - (9) Remove the reference to the SHC overburden geochemical model because it is not approved for use to identify other suitable strata. (WTG)
- g. Please revise Figure 4.1-10a, Soil Respread Thickness Map, as follows: depict the projected 24, 36, or 48 inch SPGM respread thickness areas (eliminate the 42" respread areas) with discrete polygons rather than by contouring as is currently depicted; the boundaries of SPGM respread thickness polygons should extend equidistant to the next closest drill hole location for which a different SPGM respread thickness is proposed; limit the SPGM respread thickness polygon boundaries to the mine pit boundaries and associated spoil placement areas; and revise the map legend as necessary. (WTG)
- h. Page 8 of Section 3.1.2.3 and pages 1 and 2 of Section 4.1.1.1 reference and hyperlink Table 4.1-1 that was developed to project suitable plant growth material respread thicknesses. At your discretion, you may remove the table from the permit because it is not required by NDAC 69-05.2. Although we appreciate the convenience of a summary table, the Reclamation Division routinely reviews the laboratory analysis reports for each borehole used to project SPGM respread thickness. If you choose to retain the table in the permit, please revise it as follows:
- (1) Restrict the boreholes listed to those within the mine pit boundaries;
 - (2) Please retain the EC data for each borehole, but remove the SAT column and any references to it because saturation percentage is no longer used to project suitable plant growth material respread thicknesses;
 - (3) Add the textural class and sand, silt, and clay separate percentages for each borehole because SAR and texture are used to project suitable plant growth material respread thicknesses; and,

- (4) Remove any indications or references to subsoil supplements because none have been defined according to NDAC 69-05.2-08-11 and 69-05.2-15-02(5) - (see related deficiency on other suitable strata). (WTG)
- i. There are references to suitable overburden, suitable subsoil, and subsoil supplements referring to other suitable strata throughout Section 3.1.2.3, Section 4.1.1.1, Table 3.1-5, Table 4.1-1, and possibly elsewhere in the permit. Any of those subsoil references listed above, with the exception of those referring specifically to subsoil defined by the soil survey to meet the requirements of NDAC 69-05.2-08-10, are incorrect when used in the context of supplemental material to offset a potential subsoil deficit, and must be removed from the permit. Use of the overburden drill holes required by NDAC 69-05.2-08-05(2) to identify other suitable strata is not acceptable because the drill holes are spaced too far apart (approximately one per forty acres) and overburden properties were typically analyzed at five foot intervals. We noticed on Table 4.1-1 that EC and SAR values were erroneously averaged across the 5 to 10 foot interval proposed for other suitable strata salvage. Averaging EC and SAR values would not be acceptable even if the boreholes were closely spaced and samples were analyzed at sufficiently discrete intervals. We also noticed on Table 4.1-1 that 80,700 yds³ of subsoil supplement were erroneously calculated for 10 acres around every borehole even where average EC and SAR values exceeded acceptable values for other suitable strata. (WTG & SAS)
- j. Other suitable strata is defined in Policy Memorandum No. 3 as overburden materials (other than topsoil and subsoil) that have an electrical conductivity of the saturation extract of less than 6 millimhos per centimeter and a sodium adsorption ratio of less than 12. Although the permit application has not identified any other suitable strata to offset a potential subsoil deficit, it appears that overburden data collected from the shallow overburden drilling program could possibly be used to define potential areas of other suitable strata that could be used as a subsoil supplement if it is presented in accordance with NDAC 69-05.2-08-11 and 69-05.2-15-02(5)(b). A minimum drill hole spacing of 10 acres and two foot discrete sampling intervals are typically required for the other suitable strata drilling program. Based on our review, it appears that 17 shallow overburden drill holes completed in the S½N½ and a portion of the N½SW¼ of Section 22 could be used to assess (define the area to be analyzed in more detail by more intense drilling) other suitable strata in a 100 acre area of pits scheduled for mining from 2014 to 2018. Of these 17 drill holes, it appears that other suitable strata may exist at the locations of drill holes SH-04, 05, 07, 09, 20, 24, 26, 27, 28, and 29, with up to 15 feet of other suitable strata at the locations of SH-9 and SH-27. As required by NDAC 69-05.2-08-11 and 69-05.2-15-02(5), the areal extent of any area proposed for salvage of other suitable strata must be defined in the permit application, and the associated narratives, tables, figures, and appendices must be updated to describe the proposal. (WTG)

- k. The soil removal discussion in Section 3.1.2.3 needs to be clarified. The terms topsoil and subsoil refer to specific materials. They are not interchangeable and should not be used collectively. In several instances in this narrative, SHC refers to topsoil/subsoil collectively in reference to removal, stockpiling, etc. This could infer that these materials will be mixed. The plans should state that topsoil and subsoil will be separately stockpiled. However, when addressing these materials in general terms, SPGM (suitable plant growth material) can be used. (MDB)
- l. Section 3.1.2.3, Topsoil Removal, refers to building stockpiles in accordance with NDAC 69-05.2-18-01(5). This rule does not pertain to the stockpiling of SPGM but rather refers to the disposal of excess spoils in a designed fill area. SPGM must be stockpiled in compliance with NDAC 69-05.2-15-03. Please update the narrative accordingly. (MDB & WTG)
- m. Please remove the narrative that describes stockpiling topsoil in boxcuts in the third paragraph on page 8 of Section 3.1.2.3 because the practice would be in violation of NDAC 69-05.2-15-03(2). (WTG)
- n. Please remove the narrative that describes spoil placement on undisturbed ground in the second paragraph on page 3 of Section 4.1.1.1 because the practice would be in violation of NDAC 69-05.2-15-02(2)(b)(1). Spoil can only be placed on areas where topsoil and subsoil has been removed. (WTG)
- o. The second sentence of the second paragraph on page 8 of Section 3.1.2.3 states that "When requested by the property owner, the topsoil/subsoil will be stockpiled according to surface ownership". Please revise this statement since SPGM must be segregated by ownership as required by NDAC 69-05.2-15-04(6) and can only be mixed if the landowners agree. Please revise this narrative accordingly. (DKM & WTG)
- p. Page 8 of Section 3.1.2.3 states that "A dozer will create a diversion ditch around the topsoil stockpile to help prevent erosion." This is an accepted practice in an uncontrolled watershed in which the berms will be used to control runoff from the stockpile. However, for soil stockpiles located within a controlled watershed this is not necessary and is discouraged. NDAC 69-05.2-13-05 requires that disturbance should be kept to a minimum. (MDB)
- q. The last paragraph in Section 3.1.2.3, Topsoil Removal, indicates that stockpiles will be seeded as soon as possible. However, during non-growing seasons such as fall and winter, seeding of the stockpiles does not provide any protection from erosion. Please include the practices which will be used to stabilize the stockpiles in non-growing seasons. The typical practice in North Dakota is mulching and crimping. (MDB)
- r. Please revise the narrative in the fourth paragraph on page 3 of Section 4.1.1.1 to remove the word "rough" when describing SPGM respread on approved graded spoil. (WTG)

- s. Please revise the narrative in the last paragraph on page 3 of Section 4.1.1.1 to remove any reference to “overburden” when describing reclamation of SPGM stockpiles. (WTG)
 - t. In the last paragraph on page 3 of Section 4.1.1.1, Topsoil and Subsoil Removal, that addresses stockpile reclamation, please state that the area under all stockpiles will managed to reduce the effects of consolidation and compaction, and increase infiltration prior to establishing vegetation, specifically for topsoil and subsoil stockpiles. (MSK)
222. Please revise and clarify the narratives describing SPGM respread operations in the third and fourth paragraphs on page 12 of Section 3.1.2.8, Regrading and Reclamation, as follows:
- a. Clearly state that SPGM respread thickness will be based on graded spoil characteristics as specified in NDAC 69-05.2-15-04(4)(a)(2);
 - b. Remove the reference to the 42 inch SPGM respread thickness because it was removed from NDAC 69-05.2-15 in 1999;
 - c. Remove the reference to suitable overburden because none has been defined according to NDAC 69-05.2-08-11 and 69-05.2-15-02(5); and
 - d. Remove the reference to the SHC overburden geochemical model because it is not approved for use to identify other suitable strata. (WTG)
223. In the third paragraph of Section 3.1.2.8 the word “regarded” spoil is mentioned rather than regraded spoil. Please correct. (GAW)
224. The second paragraph of Section 3.2.2 states that SPGM stripped from farmsteads will be hauled to SPGM stockpiles. In some instances, it appears that this SPGM might be directly respread. Please review and update if necessary. (GAW)
225. Section 3.1.2.4, Overburden Removal, needs to be clarified. As previously mentioned, the terms topsoil and subsoil refer to specific materials and are not interchangeable. In several instances in this narrative, SHC also refers to topsoil/subsoil collectively in reference to removal, stockpiling, etc. This could infer that these materials will be mixed. Please state that topsoil and subsoil will be separately stockpiled. (MDB)
226. Section 3.1.2.4, Overburden Removal, also refers to building stockpiles in accordance with NDAC 69-05.2-18-01(5). This rule citation is incorrect and SPGM stockpiles must be established in compliance with NDAC 69-05.2-15-03. Please update the narrative accordingly. (MDB)
227. The last paragraph of Section 3.1.2.4, Overburden Removal, states that “When overburden/interburden stockpiling is necessary, the overburden truck/loader/scrapper fleet will haul SPGM from the pre-stripping area to the stockpile locations.” Please reword to clarify that overburden/interburden (not SPGM) will be hauled from the pre-stripping locations to stockpiles. (MDB)

228. Section 3.1.2.7, Haul Road Maintenance, indicates agglomerating agents may be added to the water to minimize the amount of water needed on the haul roads to control dust. Approval from the Commission will be required before using any of these agents. Please include a statement that prior approval will be requested. (MDB)
229. Section 3.1.2.8, Regrading and Reclamation, states "When the topsoil/subsoil or suitable overburden areas are approved by the PSC, the areas will be revegetated as described in Section 4.3." The PSC does not formally approve the areas after subsoil and topsoil respread has been completed; however, the graded post-mine topography is approved by the Commission prior to beginning SPGM respread as required by NDAC 69-05.2-21-06. Please correct. (MDB)
230. Please identify all areas where mining related activities will occur within 100 feet of any intermittent or perennial stream, namely the South Branch of the Heart River (and possibly the South Tributary of the South Branch of the Heart River or the West Tributary of the South Branch of the Heart River, currently these are listed as ephemeral). This would include pit disturbance, spoil placement areas, soil removal areas, roads, stream crossings, ponds, pond outfalls, stockpiles, etc. The operator may not disturb land within 100 feet of an intermittent or perennial stream unless the Commission, after consulting with the State Engineer and State Department of Health, specifically authorizes mining activities closer than 100 feet per NDAC 69-05.2-16-20. Areas within 100 feet of intermittent or perennial streams that will not be disturbed must be designated as buffer zones and marked according to NDAC 69-05.2-13-04. Please delineate the buffer zones on the Pit Layout and Facilities Map and provide a commitment to mark the buffer zones in the field upon permit approval. (DKM)
231. Please update the Operations Plan to address how SHC will prevent the unleased federal coal tracts located within the permit area from being impacted by proposed mining on adjacent non-federal coal tracts. Please refer to the March 3, 2011, letter we received from Mr. Phillip Perlewitz. (GAW)

Figure 3.1-1 – Pit Layout and Facilities Map

232. A 500 foot blasting setback is depicted around occupied farmsteads within and adjacent to the proposed permit area. However, unless a waiver is obtained, no mining activities are allowed within 500 feet of any occupied dwelling as required by NDCC 38-14-07(5). Please correct this setback accordingly. Also, it was noted that the farmstead located in the NW¼ of Section 23 was not shown on this map with the appropriate setback. Please add the setback for this farmstead. (DKM)
233. A number of proposed SPGM and suitable overburden material stockpiles are depicted within the mine pit area on the Pit Layout and Facilities Map, Figure 3.1-1. It is uncertain if these stockpiles will be placed in these locations prior to being mined through or if they will be placed on graded spoil following coal removal. For example, in the Pit 1 area, a number of stockpiles are shown in the E½ of Section 21 and W½ of Section 22. If these stockpiles are placed in these locations prior to the

area being mined through, it seems likely that they will need to be moved/relocated by the third or fourth year of mining. Since direct respread of SPGM will likely be taking place by that time, it appears that the stockpiles would have to be relocated or be respread while additional SPGM is stockpiled elsewhere. Please review all proposed SPGM stockpile locations to ensure that relocation of the stockpile will not be necessary and that disturbance of lands where coal is not removed is minimized per NDAC 69-05.2-13-05. (DKM)

234. Please consider placing the Explosives Storage facility in the cropland in the SE¼ of Section 9 rather than disturbing native grassland and woodlands at the location where it is presently proposed. NDAC 69-05.2-13-08(6). (GAW)

Section 3.2 – Operations - Existing Structures

235. Please revise Section 3.2 to ensure that all buildings located within ½ mile of the proposed permit boundary are identified and that the current use is listed as required by NDAC 69-05.2-08-02(1)(e). The narrative in Section 3.2 references the narrative in Section 1.5.5, but Section 1.5.5 only discusses the farmsteads within the permit boundary and there is no discussion about the farmsteads or structures located within ½ mile from the proposed permit boundary. Section 2.7.1.5.5 states that all structures within 0.5 miles of the permit boundary are shown on Figures 2.7.1-2A, B & C and described in Table 2.7.1-8. However, aerial photography shows buildings in Sections 19 and 20 that are not shown on Figures 3.2-1a or 2.7.1-2A. Please review and update to clarify. NDAC 69-05.2-09-03. (GAW)
236. In Section 3.2.2, Farm Buildings/Structural Removal, please include a statement indicating the ND Department of Health will be contacted prior to removal to verify that no hazardous material (asbestos, lead paint, farm chemicals, etc.) is present prior to demolition and disposal. (MDB)

Section 3.3 – Operations - Blasting

237. Section 3.3.1, Procedures, states “All blasts will be conducted under the supervision of a certified blaster as required by Federal law and MSHA.” This is also a requirement under PSC regulations per NDAC 69-05.2-17-01(3). Please make the necessary corrections. (MDB & MSK)
238. Section 3.3.1 states the minimum weight of explosives per hole will be 22 lbs to a maximum of 55 lbs; however, Table 3.3-1 indicates a minimum blast of 16 lbs of explosives per hole (200’ distance). Please correct this discrepancy. (MDB)
239. Section 3.3.1 states blasting will occur within 150 feet of the electric transmission lines. Please address how much explosives will be used in this situation as well as the maximum allowable ground vibrations for these structures per NDAC 69-05.2-17-05(7)(a). Also please depict the transmission line(s) and distance on Figure 3.3-1. (MDB)

Section 3.4 – Operations - Air Quality Control Plan

240. Please add “subsoil” following “topsoil” in the bullet for the list of particulate matter emission sources on page 22 of Section 3.4. (WTG)

Section 3.5 – Operations – Transportation Facilities

241. In Section 3.5.1.1, Haul Road Construction, the minimum width of the haul road is provided. Please also provide the maximum width of the haul road. (MDB)
242. Section 3.5.1.1 states that haul roads and access roads may not be constructed in the exact locations shown and that the actual locations will be based on the conditions encountered in the field, pit placement and advancement of the pits. However, NDAC 69-05.2-09-06(1)(a) requires the application to include a detailed description of each road including the location. If the location of the haul roads are changed from that approved in the permit, a subsequent permit revision will need to be submitted to identify the changes. Please address accordingly. (MDB)
243. Section 3.5.1.1, Haul Road Construction, indicates 3H to 1V slopes will be used for triangular ditches; however, typical cross sections are not provided in Figure 3.5-2. Please provide the typical cross sections per NDAC 69-05.2-09-06(1). (MDB)
244. Section 3.5.1.1 states that topsoil removed for the construction of the haul road will be placed adjacent to the haul road or the nearest topsoil stockpile according to surface ownership, if requested. We are uncertain of the significance of the “if requested” statement. All topsoil and subsoil must be salvaged and appropriately stockpiled or directly respread. Please clarify the intent of this statement. It was also noted that no soil stockpiles are shown along the haul road on the Pit Layout and Facilities Map. If it appears that stockpiles will be needed to accommodate the road construction, the planned stockpile locations need to be depicted on the Pit Layout and Facilities Map. (MDB)
245. Please revise and clarify the narratives describing haul road construction of subsoil in the last paragraph on page 26 and the first paragraph of page 27 of Section 3.5.1.1 - Haul Road Construction. The Reclamation Division has historically approved the use of subsoil as a haul road base in other mine permits on a case by case basis; however, the approval is typically limited to those permits where large quantities of good quality glacial till subsoil exists across a relatively homogeneous till plain landscape and the annual soil handling plans demonstrate a large subsoil surplus. Neither of the aforementioned criteria exists at the South Heart Lignite Mine. To the contrary, the projected permit subsoil surplus or deficit remains unknown (see deficiencies in Section 3.1.2.3) and the haul road routes traverse a landscape of weathered bedrock and alluvium with widely varying subsoil quality. In addition, as proposed many of the cuts necessary for the haul road extend well below the inventoried subsoil into the underlying overburden. This could result in contamination of the subsoil. The proposal to build haul roads from subsoil will not be approved, and all references to

the proposal must be removed from the permit. As required by NDAC 69-05.2-15-02(1), all subsoil identified by the soil survey must be salvaged from the haul road routes prior to haul road construction. (WTG)

246. The last paragraph in Section 3.5.1.1 discusses the reclamation procedures for haul roads but does not address ripping or other procedures used to alleviate compaction. As required by NDAC 69-05.2-24-07-1(d), please include a statement that roadbeds will be ripped, plowed, and scarified during haul road reclamation. (MSK)
247. In Section 3.5.1.4, please include the typical Stark County construction specifications to which reclaimed/reconstructed county roads will be built. (MDB)
248. In Section 3.5.1.5, Culvert and Arch Bridge Design, the first full paragraph on page 33 states that culverts will be installed on MHR Segment 1 at the stations shown on Figure 3.5-3; however, this figure is the typical cross-section of an access road. Please reference and link to the proper figure that shows the parallel cross-section of the MHR with the location of culverts. (MSK)
249. In Section 3.5.1.5, please provide an estimation of the effects of bridge structure on the velocity and flow characteristics of the river downstream of the bridge to ensure the stream bed is stable per NDAC 69-05.2-24-03(5)(f) or what will be done to stabilize the stream bed if necessary. If no changes to the stream configuration or velocity are anticipated due to the bridge construction, please indicate so. (MDB & MSK)
250. Please provide the outfall velocities of all haul road culverts in Table 3.5-1. If the velocities exceed 5 feet per second, please include plans to stabilize these areas such as energy dissipaters, rip rap, plunge pools, concrete matting, etc. to ensure compliance with NDAC 69-05.2-24-03(5)(b). (MSK)
251. In Figure 3.5-1, General Haul Roads/Coal Ramps, CC #10 is located in the SW¼ of Section 21; however, is it not located around any road. On the same map, the solid gold line that is assumed to be depicting the disturbance boundary is not located in the legend as such. Please explain and clarify. (MSK)
252. Please depict the location of the culvert CC #10 on Figure 3.5-12, Culvert and Bridge Location Map. (MSK)

Section 3.6 – Operations – Surface Water Management

253. On page 36 of Section 3.6.1, Surface Water Management Plan, the sentence “Water will be pumped from the sump to Pond 1 for treatment prior to discharge.” is duplicated. Please delete the duplicate sentence. (MDB & MSK)
254. Page 37 of Section 3.6.1 states the sedimentation ponds will remain in service for a period up to 10 years following topsoil replacement and seeding of all disturbed areas draining to the pond. It is suggested that this wording be changed to state the

sedimentation ponds can be removed no sooner than 2 years after the last augmented seeding to meet the requirements of NDAC 69-05.2-16-09(23). Also, please include plans for managing the sump after Pond 1 is removed. (MDB & MSK)

255. Section 3.6.1, Surface Water Management Plan, and Section 3.6.5, Water Management Plan Construction and Operations, indicate that topsoil will be removed before pond construction activities begin. Section 3.6.1 states the embankment will be built from suitable overburden and Section 3.6.5 states appropriately textured material will be used. However, neither subsection discusses the removal of subsoil or if subsoil is the appropriately textured material. Please include discussion on how the subsoil will be handled with regard to this matter. Constructing pond embankments with subsoil is allowable; however, the subsoil needs to be inventoried, marked appropriately and cannot be combined with overburden. Also please include a statement regarding topsoil and subsoil replacement during reclamation. (Also see previous item related to subsoil removal/embankment construction.) NDAC 69-05.2-15-02(2). (MDB & MSK)
256. Please expand Section 3.6.3 to include a more thorough discussion of the BMPs that will be used. A major area of concern is the crossing of MHR1 across the flood plain of the South Branch of the Heart River. Figure 3.6-1 indicates straw wattles will be installed near the bridge, but it is not clear what type of BMPs will be used for the remainder of the flood plain in this area. In similar situations, other mining companies have successfully used berms along the edge of the haul road to direct runoff water from the road surface to a field-engineered sump. We have concerns that straw wattles, mulch, and grass filters may not be adequate to protect water quality in these areas that are not contained by sedimentation ponds. Consideration should be given to other BMPs such as sumps, silt fences, rock check dams, erosion control blanket, etc. or a combination thereof. (MDB)
257. In Section 3.6.5, Water Management Plan Construction and Operations, states that if the vegetative filter is inadequate a down-gradient barrier will be installed. We advise SHC that vegetative filters are ineffective in active areas; however, they do have some utility in reclaimed areas. Use of vegetative filters in active areas could result in deposition of sediment on topsoil in violation of NDAC 69-05.2-16-08(1)(d). Therefore, it is strongly suggested that references to vegetative filters be removed throughout the permit application or that their use be limited to reclaimed areas. (MDB & MSK)
258. Page 42 of Section 3.6.5 states "Following completion of the construction, the registered professional engineer shall promptly provide the SWC with a certified report..." Per NDAC 69-05.2-16-09(19)(c) the report needs to be submitted to the Public Service Commission not the State Water Commission. Please make the necessary corrections. Timelines for submitting this report are detailed in Policy Memo 12. (MDB)

259. Page 43 of Section 3.6.5 indicates that once impoundments are constructed, they will be inspected at least annually until removal and a copy of the reports will be maintained at the mine site. NDAC 69-05.2-16-09(21) requires that the ponds be inspected at least quarterly and maintained at the mine office. Of those quarterly reports, one must be conducted by or under the direct supervision of a registered professional engineer on yearly basis and submitted to the Public Service Commission per NDAC 69-05.2-16-09(19)(d). Please correct accordingly. (MDB & MSK)
260. Please expand and clarify the narrative describing NDPDES discharges in the second paragraph on page 43 of Section 3.6.5 to meet the requirements of NDAC 69-05.2-09-12-1(c) and 69-05.2-16-05-1(b). Many of the reporting protocols in the current narrative are incorrect. (WTG, MDB & MSK)
261. Please address the requirements of NDAC 69-05.2-09-09(2)(j) in Section 3.6.5 - Water Management Plan Construction and Operations. This should include any discussion of ground water flow which may be associated with base flow from the South Branch Heart River into or out of the sedimentation ponds. Also, please include the construction procedure, lift thicknesses, compaction rates, moisture content and density testing that will be done when constructing the pond embankments. NDAC 69-05.2-16-09(16). (MDB)
262. Brush windrows are mentioned as a BMP in Section 3.6 – Surface Water Management. Brush windrows are not an approved BMP. Please remove this wording from the permit. (MSK)
263. The second paragraph of Section 3.6.1, Surface Water Management Plan, states that “Up gradient diversion structures, highwall berms and impoundments may also be used to minimize the surface runoff entering the active mine area.” While this is an acceptable statement, the next statement which states, “These measures serve to reduce the volume of disturbed area runoff that will need to pass through sediment control structures” is incorrect. The sedimentation ponds must be designed to capture all surface water runoff from the disturbed areas draining to a pond, plus any additional capacity that may be needed for any pit water that may be pumped into the pond. Field designed structures such as sumps or small berms designed to catch runoff before it enters the pit will affect the time of concentration of the watershed; however, the sedimentation pond must be designed to handle any volume of runoff that is stored by these structures, i.e., the sedimentation pond must be designed to handle the runoff from the entire watershed including that which is diverted to field engineered structures. Please make the necessary corrections to address these matters. (MSK)
264. The last paragraph on page 35 of Section 3.6.1 states that “Runoff from disturbed areas that cannot be treated in the sedimentation pond is either contained by berms or treated using BMPs in order to prevent additional contribution of sediment to streams.” Please be aware that all runoff from active areas must pass through a sediment pond prior to discharge with only a few exemptions (e.g., haul roads, small area disturbances, etc.) (MSK)

265. The second full paragraph on page 37 of Section 3.6.1 states that ground water will be pumped into ditches that will drain to the ponds. Please show these drainage ditches on Figure 3.6-1, Life of Mine Water Management Plan. Also, the sediment load from the ditch, plus the intended amount of ground water, will need to be accounted for in the pond design. (MSK)
266. The second sentence in the fourth paragraph on page 42 of Section 3.6.5 states "The water will be removed from the sedimentation pond as soon as water quality appears to be within acceptable limits for discharge." The pond can be discharged after a water quality sample has been taken and meets the limits of the NDPDES Permit. Please revise. (MSK)

Section 3.0 - Operations -Tables

267. Please update the dates and footnote on Table 3.1-1 to clarify the current anticipated start of construction activities (seems unlikely that construction activities will begin in 2011). Also, please update other dates in the table if necessary. (MDB)
268. The list of equipment in Table 3.1-3, Equipment List, needs to list the number of pieces of equipment which are planned, not a range. This table is updated on a regular basis and accurate equipment numbers should be provided. (MDB)
269. Table 3.1-4, Summaries of Lignite and Overburden Thicknesses, lists all thicknesses as overburden. However, for some of these intervals, the material may be interburden since it is located in between the coal seams. Please clarify. (MDB)
270. On Table 3.6-1, when calculating runoff values for sedimentation ponds in Appendix 3.6-2, please use a Curve Number of 90 for any mining disturbance areas regardless of soil type. Please update the pond calculations accordingly. (MDB)

Section 3.0 – Operations – Figures

271. On Figure 3.1-1, Pit Layout and Facilities Map, please depict the proposed layout of each individual pit as required by NDAC 69-05.2-09-02(4). The narrative on page 11 of Section 3.1.2.6 indicates individual pits will be 150 feet wide; however, the individual pits are not depicted on Figure 3.1-1 or Figure 3.1-2, Life of Mine Overburden and Lignite Removal Schedule Map. While Figure 3.1-2 shows the proposed mining blocks by year, it does not depict the individual pits. We recommend showing the layout of the individual pits on Figure 3.1-1 rather than Figure 3.1-2. (JRD)
272. Please label Farmstead No. 5 on Figure 3.2-1a in a manner similar to the other farmsteads on the map. (SAS)
273. If Figure 3.1-2 is serving as the Extended Mine Plan Map, please include the estimated coal crop lines on this map as required by NDAC 69-05.2-07-03(4). (GAW)

274. Figures 3.5-2, 3.5-3, and 3.6-4, as well as Table 3.6-3, indicate ditch bottoms of 4 feet and 1 foot, respectively. Several concerns arise with this narrow of a ditch bottom, such as controlling erosion due to the concentrated flow and the ability to construct and stabilize the ditches to the designed criteria. Consideration should be given to the size of equipment which will be used in construction of the ditches and the required maintenance of such narrow ditch bottoms. It would seem likely that a wider ditch bottom would be more practical from both a construction and maintenance standpoint. Please review and update as appropriate. (MDB & MSK)
275. On Figure 3.5-13, the river cross-section stationing does not correspond with the stationing shown on the plan view. Please correct as necessary. (MDB)
276. Figure 3.6-1, Life of Mine Water Management Plan, shows the West Tributary of the South Branch of the Heart River ending in Section 15; whereas, other maps show this stream channel joining the South Branch of the Heart River further downstream. Please review and revise as necessary. (MSK)
277. Please include cross-sections of the pond embankments for Ponds 1 and 2 on Figures 3.6-6 and 3.6-7. (MSK)
278. The design plans for the Facilities Area Sump, Figure 3.6-8, show this impoundment with an emergency spillway. Dugout sumps generally do not have a spillway. This sump collects gray water from the shop facility along with the runoff from the facilities area. Designing this structure function as a sediment pond and increasing the detention time of runoff will eliminate the need to pump water from it into Pond 1. SHC may then be allowed to discharge that water into the South Branch of the Heart River when effluent standards were met. Please address this issue in the narrative associated with the structure. (MSK)
279. Based on information on Figure 3.5-11b, it appears access to the WAPA substation will no longer be available from the county road between Sections 17 and 20. Please indicate how access will be provided to this facility. (MSK)
280. Figures 3.5-11a and 3.5-11b, Site Access Route Map and Right of Way Closure and Road Relocation Map, please make a distinction between which "roads" are minimum maintenance, section lines or county roads, and any paved routes. Oftentimes the right-of-way width is different for each of the aforementioned classes of roads. Also the Existing Structures Map (Map 3.2-1a) which shows roads/trails is not the same as Figures 3.5-11a and 3.5-11b. Please make the necessary changes. (MSK)

Section 3.0 – Operations – Appendices

281. The addresses for several landowners are missing on Appendix 3.3-4. Please provide these addresses. (MDB)

282. When calculating pond volumes in Appendix 3.6-2, SHC needs to evaluate the entire watershed without breaking it into sub-watersheds. Please update the pond calculations accordingly. This may increase the amount of storage required for sedimentation Ponds 1 and 2. (MDB)
283. In Appendix 3.6-2, please include a summary at the beginning of each pond design of basic design information for each pond. While this information is included in the detailed design plans, providing the summary information helps facilitate our reviews. Staff carries out independent reviews of the impoundment calculations. An example of the summary is shown below. (MDB)

Impoundment Design	
Impoundment Configuration	Embankment/dugout
Required Runoff Storage	88.9 Ac-ft
Required Sediment Storage	4.3 Ac-ft
Design Capacity	99 Ac-ft
Excavated Capacity	63 Ac-ft
Top Width of Embankment	15 ft
Maximum Height of Embankment	6 ft
Minimum Freeboard	1.0 ft
Embankment Fill Slope	4H:1V
Excavated Cut Slope	4H:1V
Pond Bottom	1988
Top of Embankment	1998.6
Permanent Pool Elevation	1992
Principal Spillway Elevation	NA
Emergency Spillway Elevation	1996.2
Design Storm Crest	1997.6
Emergency Spillway Design	
Spillway Configuration	Earthen, Trapezoidal, open channel
Bottom Width	20 ft
Side slopes	3H:1V
Maximum Depth	2.2 feet
Exit Slope (ft/ft)	0.046 ft/ft
Peak Outflow	192.3 cfs
Surface Treatment	Vegetated
Exit Velocity	2.65 ft/s

284. Since the shop/office sump will be pumped to Sedimentation Pond 1, additional storage will be required in Pond 1 to account for this additional water from the sump. Pit water will also be pumped into the ponds. It is unclear if this additional water was accounted for in the design. Please clarify and if it was not accounted for, Appendix 3.6-2 should be updated accordingly. (MDB)

285. Please provide the outfall velocities for all culverts, pond discharge points, and emergency spillways listed in Appendix 3.6-2. If the velocities exceed 5 feet per second, please include plans to stabilize these areas such as energy dissipaters, rip rap, plunge pools, concrete matting, etc. NDAC 69-05.2-16-10. (MDB)

Section 4.1- Reclamation Plan

286. The progression of reclamation activities as described in Section 4.1.1 seem to be out of order. As currently presented, soil respread is discussed before backfilling and grading. Please review this subsection and consider placing the activities in the normal order in which they would take place. (SAS)
287. In Section 4.1.1.2, Hydrological Features, please include a statement that detailed design plans will be submitted by permit revision for each post-mine wetland area prior to construction (as was done for the stockponds) to comply with NDCC 38-14.1-24(7). (MDB)
288. Section 4.1.1.3, Roads and Ramps, states in the event that there is excessive haul road fill material; it will be removed and used in reclamation of the final highwall or regrading of the active pit spoils. Haul roads are normally one of the last features to be reclaimed since they are needed to provide access for reclamation activities. Stating that the material will be disposed of in the final reclamation may not be feasible or practical. Please review and address this concern. (MDB)
289. Please include a statement in Section - 4.1.1.3 regarding ripping or scarifying haul roads prior to reclamation to comply with NDAC 69-05.2-24-07(1)(d). (MDB)
290. The second paragraph on page 7 of Section 4.1.1.6 indicates that scarification will relieve compaction and consolidation. While scarification is required to reduce the compaction on haul roads and other high traffic areas, it is more commonly done to prevent slippage planes. Please revise this discussion accordingly. (MSK)
291. Please indicate in Section 4.1.1.6 that once an area is final graded that SHC will submit a grade approval request to the Commission as required by NDAC 69-05.2-21-05. (MSK)
292. Section 4.1.1.7, Rough Grading Conditions and Assumptions, states it will normally be possible to maintain rough grading within four spoil ridges behind the active pit or that regrading will begin within the maximum allowable 180 days. NDAC 69-05.2-21-01(2) states that backfilling and grading must be completed within 180 days of coal removal. Also, since the mine is proposed as a truck/shovel mining operation, typical dragline spoil ridges will not be present. Please revise as necessary to address these concerns. (MDB)

293. The narrative in Section 4.1.1.7 indicates that final grading, respreading of subsoil, respreading of topsoil, and revegetation will only occur after each phase of reclamation is approved by the PSC. However, per NDAC 69-05.2-21-06(1), the only required approval needed from the PSC is after final grading has been completed and prior to replacement of SPGM, not after each phase as stated. Please review and consider revising the present wording (MDB)
294. In Section 4.1.1.7, Rough Grading Conditions and Assumptions, please justify why SHC used a swell factor of 15%. Other North Dakota mining companies generally use a swell factor between 8-10% based on their experience with the type of overburden materials present here. (MSK)
295. The html link at the bottom of page 10 of Section 4.1.1.8, General Considerations for Reclamation, goes to Section 3.5.1 instead of Section 3.1 as intended. Please correct. (SAS)
296. In the first sentence on page 9 of Section 4.1.1.7, Rough Grading Conditions and Assumptions, please refer to "...spoil peaks..." rather than "...spoil piles..." which could lead a reader to think in terms of overburden stockpiles. (SAS)
297. The Reclamation Schedule (Sections 4.1.2.1 through 4.1.2.5) for Pits 1 through 5 does not contain enough detail to ensure the plan is practical or feasible. Oftentimes, the reclamation schedule seems to contradict other sections of the permit. For example, Section 4.1.2.1 states that "After mining has advanced five cuts, material from the out-of-pit overburden stockpile will be hauled back to the initial boxcut pit and be placed on the dozer regrade area". It is not clear what is meant by this statement since elsewhere it is stated that reclamation is going to be contemporaneous. During the first five years of mining in Pit 1 (years 2014-2021) as the pit sequence lengthens, it appears more area will be stripped than what will be mined and available for backfilling with spoil. Either the grades will have to be raised or more spoil will need to be stockpiled for longer periods of time. It does not appear that the grades will be raised according to Figure 4.1-7a. Therefore, it seems unlikely that all of the boxcut spoil can be returned to the first five pits shown on Figure 3.1-2 considering that the volume of spoil material generated each year will be increasing for the first several years. Additionally, the Rough Grading Sequence Map, Figure 4.1-1, and the SPGM Respread Sequence Map, Figure 4.1-2, only show a mining schedule through 2019. Other sections have plans and information for life of proposed mining activities. The regrading section, Section 4.1.1.6, states that overburden grading will generally be 2 to 3 spoil rows from the active lignite removal pit. This is confusing as there will not be any dragline created spoil ridges with a truck/shovel operation. Any areas for which reclamation cannot be completed within the required time periods typically required by law and rules must be identified. Any variances from the contemporaneous reclamation provisions must be requested and include the appropriate justification. Please review and provide a more realistic and detailed estimated timetable for each reclamation phase as required by NDAC 69-05.2-09-11(1), NDAC 69-05.2-21-01, and NDCC 38-14.1-24(14). (GAW, MDB & MSK)

298. It appears the reference to Table 4.1-2 in the first line of Section 4.1.2 should actually be Table 4.1-4. Please make the necessary corrections. (SAS)
299. The last sentence in this section on page 11 of Section 4.1.2.1, Pit Area 1, states "Mining cuts having less than 70 ft of overburden over the D Seam will be mined using D11 Class dozers and all material greater than 70-ft-thick will be removed using the truck/loader fleet." This is inconsistent with what is stated in Section 3.1.2.4, Overburden Removal. Please correct this discrepancy as necessary. (SAS & MSK)
300. Based on the backfilling and grading sequence as explained on page 12 of Section 4.1.2.1 for Pit 1 and the subsequent pits, it appears all of the boxcut spoils will be used prior to the final pit for these pit sequences. Please address how adequate material will be obtained for backfilling the final pit in each sequence. (SAS)
301. Section 4.1.3.1, Worst Case Reclamation Liability, states that the July 2009 variable costs were used to develop the reclamation cost estimate. The cost estimate should use the July 2010 variable costs. Please correct as necessary. (MDB & MSK)
302. Section 4.1.3.1, Worst Case Reclamation Liability, states the water wagon cost factor for SPGM respread as 1 hour/12 scraper/loader hours. Under Policy Memo 16, this should be 1 hour/12 scraper/truck hours. Please make the necessary corrections including Table 3 of Appendix 4.1-4. (MDB)
303. Section 4.1.3.2, Assumptions for Associated Disturbance, states for the purpose of worst case bonding, the haul road was assumed to have been built out of subsoil or overburden that is to be used as topsoil/subsoil replacement. This assumption cannot be used since, as discussed previously, we will not allow the haul roads to be constructed with subsoil. Please update this Section, Appendix 4.1-1 as well as Figure 4.1-5a accordingly. (MDB & MSK)
304. The assumptions used for haul road reclamation costs in Section 4.1.3.2 state that roads with a 50 foot top width, 2 foot depth and 92 foot road base were used. However, Section 3.5.1.1 states the roads will have a top width of 60 foot, 2 foot depth and 4V:1H slopes giving a road base of 76 feet. Please update the assumptions and calculations accordingly. Also, please take into account the amount of cut and fills that will be required to bring MHR 1 back to original topography. Please update the assumptions and calculations accordingly. (MDB)
305. Page 18 of Section 4.1.5, Post-Mining Topography Map Generation, states that "Prior to rough grading, proposed post-mining contours will be developed based on actual aerial or ground surveys after mining is completed in the pit area. The new post-mining contours will be submitted to the PSC for approval. Upon PSC approval, rough grading will commence." This approach is unacceptable and contrary to the approved practice. The actual grading must closely conform to the approved post-mining topography (Figure 4.7-1a). The actual post-mining contours will be compared to those shown on the approved post-mining topographic map. Other than minor and inconsequential changes, the approved post-mining topography can only be changed

via the revision process and any changes must be justified. Oftentimes the post-mine topography changes when there is a change in mine plans or mining methods. The application states that grading will be done on a pit area basis. We assume this to mean the large pit block areas as depicted on Figure 3.1-1. If that is the case, it appears grading would not begin on the Pit 1 area until 2021, the date when coal removal is tentatively scheduled to be completed from the area. NDCC 38-14.1-24-14 requires that all reclamation activities through seeding be completed no longer than three years from the completion of surface coal mining operations. Under this scenario a waiver from the contemporaneous reclamation requirements would be needed for all pit areas. Please make the appropriate changes to Section 4.1.5 and/or address these concerns. (MDB & MSK)

306. Section 4.1.5 also details the process used to calculate and develop the post-mining topography map for the first five years of mining and the worst case pit. A total of 6.6 MCY would be needed to achieve this topography in the worst case scenario. While these calculations are needed for the worst case bonding, mass balance calculations are also needed for the life-of-mine to demonstrate that the proposed post-mining topography is achievable, not just for the worst case pit. For the mass balance calculation, the depth of overburden from the pre-mine soil surface to the top of the coal seam should be swelled by the appropriate factor and compared to the amount of overburden needed to achieve the post-mining topography from the bottom of the coal seam. Each pit in Pit Areas 1-5 should be a separate mass balance unless material from one pit area will be used in another pit area. If that is the case, please note the source of the material and where it will be ultimately backfilled. Please submit the required calculations as well as an AutoCAD map (Isopach Map) of the lowest mined seam of coal. (MDB)

Section 4.2 – Post-Mining Land Use

307. The first sentence in the second paragraph of Section 4.2.1 states that most of the post-mining land will be reclaimed as cropland, riparian woodland and tame pastureland. The Post-Mining Land Use Map, Figure 4.2-1, and Table 4.2-2 indicate that there will be more native grassland reclaimed than riparian woodland or tame pastureland. Please edit the sentence accordingly. (GAW)
308. The Post-Mining Land Use Map, Figure 4.2-1, depicts a large right-of-way/road that will be reclaimed through the N½ of Section 27 to replace a pre-mine trail. On page 23 of Section 4.2.2, please clarify if this is a public right-of-way/road or a private road or trail. (GAW)
309. On page 25 of Section 4.2.2, please discuss replacing the pre-mine developed water resource located in the SW¼ of Section 15. Although Mary Louise Peters preference statement does not clearly state the this pond should be replaced, it indicates she wants her pre-mine ponds located in Section 16 replaced, as well as retaining two sediment ponds as developed water resources. Mary Louise Peters also requests that an artesian well be replaced. Please review and revise as necessary to address these matters. (GAW)

310. Many of the narratives that address the landowner preference statements in Section 4.2.2 state that the surface owners requested that their lands be “converted” to the pre-mine land uses. There are no land use conversions if the pre-mine land uses are being reclaimed and implemented. Please review and revise to provide clarity. It is suggested that the word “convert” be changed to “return” or “retain”. (GAW)
311. Please include a landowner’s post-mining preference statement(s) from the Leocadia Emmil Family Trust for the NW¼ of Section 34 if one has been received since the application was filed. (SAS)
312. The small semi-permanent wetland that is planned in the SW¼ of Section 22 should be placed in its approximate pre-mining location. The current proposed location converts cropland to wetland and the tame pastureland where it was located in the pre-mine setting provided a buffer zone from sedimentation associated with cropland runoff. (GAW)
313. The third paragraph on page 28 of Section 4.3.2 lists pre-cropland and temporary land use seed mixes. Pre-cropland and temporary are not land uses. Please revise as necessary. (GAW)
314. The first sentence of the second paragraph on page 29 of Section 4.3.2 states that the pre-cropland seed mix might be planted in mid August through September, but the next sentence states that cereal grains would then be seeded the following spring. It is not clear why the pre-cropland perennial seed mix would be planted in late summer only to be tilled the following spring. If that is the case, it may be more appropriate to plant a cover crop the first year. Please clarify as necessary. (GAW)
315. The first sentence of Section 4.3.3 states that “Soils replaced and regraded will be originally removed from the mine area where baseline studies show a healthy vegetative community”. Please clarify this sentence. (GAW)
316. Please revise the statement in Section 4.3.4.2 that states “Livestock grazing should not be recommended on tracts designated in this land use (tame pastureland) until after success standards have been met.” The Reclamation Division strongly encourages grazing reclaimed tame pastureland and native grassland during the revegetation responsibility period to demonstrate that these reclaimed lands are capable of supporting their intended post-mine land use. In addition, prescribed grazing is a valuable tool for maintaining the desired species composition. (GAW)
317. In the Riparian Woodland discussion, Section 4.3.4.5, please discuss consulting with the State Game and Fish Department, the State Forester and the Natural Resource Conservation Service in the development of the woodland plantings as required by NDAC 69-05.2-22-02(4). (GAW)
318. It appears that the first paragraph on page 34 should be listed under a new subsection since it is a summary of Section 4.3.4. It is presently listed under Riparian Woodland subsection. Please review and revise if necessary. (GAW)

319. Please revise Section 4.3, Revegetation Plan, to include detailed management and revegetation plans for all of the proposed post-mine land uses. This would include seed mixtures for farmstead yards, industrial areas such as ditches associated with reclaimed roads, and design plans for shelterbelts. NDAC 69-05.2-09-11(6). (GAW)
320. Please revise the first paragraph on page 35 of Section 4.3.5, General Management Plans, to discuss livestock grazing during the revegetation responsibility period and revise the statement regarding mechanical rejuvenation to break-up the sod to clarify that the resulting disturbances will need to be minimal to ensure the revegetation period will not be restarted. In other words, disturbances on reclaimed native grasslands and tame pasturelands that result in the area being reseeded restart the 10-year revegetation responsibility period. (GAW)
321. The second and third paragraphs of Section 4.3.6.3 indicate that native grassland reference areas may be established. The PSC Revegetation Success document requires that reclaimed native grassland productivity and cover standards be determined with the use of an approved native grassland reference areas. Therefore, please revise the language for compliance with NDAC 69-05.2-08-08 and 69-05.2-22-07 and Section II-D of the Revegetation Success Standards document. (GAW)
322. Developed water resources are discussed in the Water Quality and Quantity section of 4.3.6.5 as if they were wetlands. Wetlands and developed water resources are separate and distinct land uses. Please remove language that attempts combining these two land uses in Section 4.3.6.5. (GAW)
323. Please indicate how many acres of woodlands are actually present on Robert and Brenda Kuylen's tame pastureland – woodland land use that they have requested to be converted to cropland. Please provide plans to replace the woodland acreage in native grassland or other compatible land uses to show a no net loss of woodlands in the permit area. Language at the bottom of page 25 of Section 4.2.2 states that there will be a 47.1 acre decrease in tame pastureland – woodlands but this land use complex is not listed on their landowner preference statements. Please review and edit to provide clarity. (GAW)

Section 4.3 – Revegetation Plan

324. Section 4.3.4.1, Cropland, states "The pre-cropland vegetation may be left throughout the responsibility period to serve as a hay crop or broken by strip planting in some locations for small grain crop production for the purposes of revegetation success determination." Reclaimed cropland tracts remaining in pre-cropland vegetation must be assessed for final bond release using annual small grains or row crops if the area had been annually cropped prior to mining. Only areas specifically approved in the reclamation plan as perennial hayland as requested by the landowner or where the pre-mine was perennial hayland can use hay crops for final bond release purposes. Reclaimed cropland must be in a condition to be cropped (pre-cropland areas must be broken, rocks picked, etc.) at the time of final bond release unless the owner agrees to

leave a portion in the pre-cropland vegetation. Regardless, at least a representative portion of the pre-cropland areas must be broken to prove cropland reclamation success. Please revise this statement accordingly to clearly make this distinction. (SAS)

325. Please remove the reference to the Climatic Correction Method No. 3 (regression equation) in this first paragraph of Section 4.3.6.1, Cropland, since it will be removed from the Revegetation Success Standards Document with the next revision to that document. An adequate regression equation has not been developed for this purpose. The discussion following this sentence will also have to be adjusted accordingly. (SAS)

Section 4.4 – Predicting Potential for Re-establishing Vegetation

326. The fourth paragraph on page 44 of Section 4.4.2 states that the subsoil will first be removed from the active mining area and once directly respread then the topsoil will be removed and respread. The order of SPGM removal (subsoil first, then topsoil) appears reversed unless some of the topsoil will be removed and stockpiled prior to the subsoil being removed. Please revise this paragraph accordingly. (SAS)

Section 4 – Post-Mining and Reclamation Plans - Tables

327. Table 4.1-3, Pre- and Post-Mining Wetland Acreage Comparison by Landowner and Water Regime, indicates that Gary and Barbara Meduna's pre-mine wetlands (1.79 acres) will not be replaced on their property. It is not appropriate to move pre-mine wetlands to other surface owner's property without their approval given that some surface owners may not want wetlands on their property. Please revise the plans to replace Gary and Barbara Meduna's pre-mine wetlands on their property. In addition, please review the reclamation plans for all other landowners to ensure that their pre-mine wetland acreage is replaced on their own land. (GAW)
328. Table 4.1-3, Pre- and Post-Mining Wetland Acreage Comparison by Landowner and Water Regime, indicates that SHC is planning to reclaim 10.15 acres of additional wetlands but none of the landowner preference statements request additional wetland acreage. Please revise this table and all other associated tables, figures, narrative and exhibits to comply with the landowner's wishes or indicate (with proper justification) why the landowners wishes cannot be met. (GAW)
329. In Table 4.1-4, Reclamation Schedule, please include the construction and reclamation dates for the sedimentation ponds per NDAC 69-05.2-09-09(1)(d) and for haul roads per NDAC 69-05.2-09-06(1)(h). This may also be done in a separate table if preferred. (MDB)
330. Table 4.1-4 is somewhat confusing when looking at both pit areas and year areas under the Reclamation Area column. It would be easier to understand if a line were added in the middle of the table above where the pit numbering starts and another above where

the year designation starts labeled “By Pit Sequence” and “By Years”, respectively. This would allow the reader to see the difference between the total pit sequences and the individual yearly progression. Please provide clarity to this table as necessary. (SAS)

331. Please place the detailed land use types (i.e. corrals/feedlots, driveway, feed/haylot, right-of-way lane, road surface, etc.) listed in Tables 4.2-1 and 4.2-2 as subcategories under one of land uses listed in NDAC 69-05.2-23-02. Although the Reclamation Division appreciates the detailed land use types provided in the pre-mine land use section of the permit, clarification is needed in the post-mine section to determine the appropriate revegetation success standard that will be applied to the post-mine land uses. (GAW)
332. Silver Buffaloberry is listed both as a tall and low shrub species in Table 4.3-5, Stocking Rates for Woody Species. Presumably, the low shrub layer will be planted with Silverberry (*Elaeagnus commutate*) rather than Silver Buffaloberry. Please review and correct as necessary. (GAW)

Section 4 – Post-Mining and Reclamation Plans - Figures

333. Table 1 in Appendix 4.1-1, Bond Calculations, breaks the dozer pushes into three regions for the pit; however, these regions are not identified on Figure 4.1-5a. Please identify these regions on Figure 5.1-5a. (MDB)
334. SPGM Stockpile Nos. 5 and 7 are both shown on Figure 3.6-2 as being constructed during the first permit term; however, they are not included on Figure 4.1-5a or as part of Appendix 4.1-1. It is assumed these stockpiles are for the topsoil that will be removed from a portion of the explosives access road and the explosives storage area. Please include calculations for the respread of these stockpiles as well as showing them on Figure 4.1-5a. Corresponding changes will also have to be made to Table 3 regarding the D9 dozer, motor grader and water wagon hours. (MDB)
335. Please depict a buffer zone consisting of perennial vegetation adjacent the recreated drainage channel located in the SE¼ of Section 16, SW¼ of Section 15, and the NE¼ of Section 23 and delineate this buffer zone on Figure 4.2-1, Post-Mining Land Use Map. The reclaimed drainage channel and the associated wetlands were surrounded by tame pastureland in the pre-mine setting and the final bond release performance standards for recreated wetlands requires that ground cover in the area contiguous to the wetland be adequate to control erosion. Section 4.1.1.2 states that the channel and floodplain will be vegetated. Section II-H-10 of Revegetation Success Standards Document. (GAW)
336. SHC is proposing to change the land use of an area located along the south edge of the NW¼ of Section 16 from native grassland to cropland. The Reclamation Division believes this area will be too steep to accommodate the proposed land use change. Please retain the pre-mine land use for this area. This area is outside of Pit 2, but may

be disturbed by mining activities given its proximity to the pit as shown on the Pit Layout and Facilities Map. Also, pre-mine land uses should not be changed on lands that are not disturbed by mining activities. NDAC 69-05.2-13-05 & NDAC 69-05.2-23-03. (GAW)

337. Figure 4.2-1, Post-Mine Land Use Map, indicates that corrals, feed lots, hay lots, farmstead yards, shelterbelts and other farmstead related features will be reclaimed in the SW $\frac{1}{4}$ of Section 16, NW $\frac{1}{4}$ of Section 21, NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 27 and the northeast corner of Section 22. These pre-mine farmsteads will be affected by mining activities. Please provide additional details regarding replacing these farmsteads in Section 4.0, Post-Mining and Reclamation Plans, as shown on the Post-Mine Land Use Map or revise the Post-Mine Land Use Map, Section 4.2-1, and the associated tables and figures accordingly. (GAW)
338. SHC is proposing to construct a developed water resource on the section line between Sections 9 and 16. Please consider relocating this developed water resource so that it does not affect public access along this statutory right-of-way. (GAW)
339. Figure 4.2-1, Post-Mining Land Use Map, indicates that most of post-mine developed water resources are also functioning as reconstructed wetlands. Reconstructed wetlands are different land uses than developed water resources given that there may be maintenance issues associated with developed water resources, such as risers and pond embankments. Please revise to show reconstructed wetlands and developed water resources as separate and distinct post-mine land uses. (GAW)
340. The southwest corner of the pre-mine tame pastureland located in the W $\frac{1}{2}$ of the NW $\frac{1}{4}$ of Section 21 is too steep to accommodate the proposed post-mine land use of cropland. In addition, SHC is proposing that other portions of this tract of tame pastureland be converted to cropland even though the area is outside of the mine disturbance area. As previously discussed, it is not appropriate to change the post-mine land use of areas that are not disturbed by mining activities. Please revise accordingly. (GAW)
341. SHC is proposing to replace approximately one-half dozen relatively small woodlands within reclaimed cropland in the S $\frac{1}{2}$ of Section 21. Although woodlands were in these pre-mine locations and given the proposed land use changes for the areas adjacent to these woodlands, the Reclamation Division does not believe it prudent or practical to reclaim small, isolated woodlands within tracts of cropland. Please review and revise as deemed necessary. (GAW)
342. SHC is proposing to retain several small, irregular tracts of reclaimed native grassland in the SW $\frac{1}{4}$ of Section 21, NW $\frac{1}{4}$ of Section 17, and SE $\frac{1}{4}$ of Section 17 as they existed prior to mining. Please consider consolidating this acreage with the adjacent reclaimed native grassland so that the tracts become more manageable and useable. (GAW)

343. SHC is proposing to reclaim narrow strips of tame pastureland in the SW¼ of Section 23, W½ of Section 22, between cropland and native grassland in Section 27, and a narrow right-of-way corridor in the NE¼ of Section 22. Please review these areas and consider reclaiming areas to the adjacent post-mine land uses as it does not appear practical to reclaim these areas as currently proposed. (GAW)
344. SHC is proposing to reclaimed "Native-Pastureland" in the SW¼ of Section 27, NE¼ of Section 23, and SW¼ of Section 16. This is not a land use category and it needs to be changed to either native grassland or tame pastureland. Please clarify the land use in accordance with NDAC 69-05.2-23-02. (GAW)
345. Please edit Figure 4.2-1, Post-Mine Land Use Map, to make a distinction between public right-of-way roads and private trails. The map presently indicates that a public right-of-way will be constructed in the N½ of Section 27, which may be incorrect as it appears to be a two-track farm access trail. A public right-of-way road can only be constructed on statutory right-of-ways or where the county has the necessary easement. Please review and correct as necessary to clarify. (GAW)
346. Please consider placing the wetland that is to be reclaimed in the S½ of the SE¼ of Section 9 in the reclaimed drainageway with adjacent native grassland rather than in the reclaimed cropland adjacent to the county road. The pre-mine wetlands were located in this drainageway prior to mining and the proposed location of the wetland may interfere with crop production and affect the county road. (GAW)
347. The Post-Mining Land Use Map, Figure 4.2-1, indicates that a pond will be created in the cropland in the SW¼ of Section 23, but James and Rosella Perdaems requested their land be reclaimed to its pre-mine land uses. Please review and revise as necessary. (GAW)
348. Please revise Figure 4.1-7c - Permanent Impoundments, Re-Established Channels and Wetland Restoration - to distinguish between impoundments (developed water resources) and reclaimed wetlands. These are separate and distinct land uses. (GAW)
349. Please revise Figure 4.1-7c - Permanent Impoundments, Re-Established Channels and Wetland Restoration - to indicate that a replacement developed water resource will be constructed in the tame pastureland located in the SW¼ of Section 23 as shown on the Post-Mining Land Use Map, Figure 4.2-1. (GAW)
350. Figure 4.1-7c - Permanent Impoundments, Re-Established Channels and Wetland Restoration - does not show a developed water resource being replaced in the NE¼ of the NE¼ of Section 22 where one existed prior to mining. Please show that this pond will be replaced on the map to fulfill the wishes of the surface owners. (GAW)
351. We recommend that post-mining stockponds be designed according to NRCS Guidelines located at: http://efotg.sc.egov.usda.gov/references/public/ND/ag handbook_590_keep_for_ref.but_placed_a_weblink_in_eng.document.pdf. Please update

Figure 4.1.7-c, Design of Reclaimed Stock Pond and the associated narrative accordingly. The current design plan lists the “top of topsoil” as 2,545 feet and the pond bottom at 2,486 feet which would indicate a pond depth of 59 feet. Please make the necessary corrections to the design. (MSK)

352. Figures 4.1-2 and 4.1-3 both show the Mine Facility Area, haul roads, stockpiles, and explosive storage building as being reclaimed in 2019. This contradicts plans in other portions of the application. Please correct this discrepancy. (MSK)
353. The cross-sections provided on Figure 4.1-5c, Worst Case Cross-Sections, only show 3 spoil peaks (pit widths) behind the pit. Under the assumptions used to calculate the worst case estimate, it is stated that 4 spoil peaks (or 4 pit widths when using a truck/shovel operation) were used to determine the bond amount. Please correct this discrepancy. (MSK)
354. Figure 4.1-7a, Post-Mine Topography, depicts several relatively flat areas with long, broad slopes, specifically in the SW¼ of Section 21 and the NW¼ of Section 22. It is recommended that a few secondary drainages be incorporated into the post-mine topography of these areas similar to that which exists prior to mining. (MSK)
355. Please review, and revise as necessary, the following borehole labels on Figure 4.1-10a, Soil Respread Thickness Map. It appears that the label shown for borehole SHOB-12C in the SW¼ of Section 16 should be corrected to read SHOB-12R to be consistent with Table 2.3-5; the label shown for borehole SHOB-21C in the SE¼ of Section 16 should be corrected to read SHOB-21R to be consistent with Table 2.3-5; the label shown for borehole SHOB-28R in the SE¼ of Section 15 should be corrected to read SHO2-10C to be consistent with Table 2.3-5 (please note that borehole SHOB-28R appears to be correctly labeled in the NW¼ of Section 22); and, the label shown for borehole SHMW-10D in the SW¼ of Section 23 should be corrected to read SHMW-10D2 to be consistent with Table 2.3-5. (WTG)

Section 4 – Post-Mining and Reclamation Plans – Appendices

356. In Table 1 of Appendix 4.1-1, Bond Calculations, the haul road calculations do not correspond with the assumptions provided in Section 4.1.3.2. Since the haul roads are named or otherwise identified, please consistently identify the roads by their names or abbreviations throughout the permit, ensuring that the haul road information corresponds between Sections 4.1.3.2, Figure 4.1-5a, and Table 1 of Appendix 4.1-1. (MDB)
357. Table 1 of Appendix 4.1-1 includes costs for dozer pushes of SPGM and overburden stockpiles. We are uncertain as to why a dozer push is needed for stockpiled material. It appears these stockpiles would require a scraper or truck/shovel haul. Please review and update as necessary. (MDB)

358. In Appendix 4.1-1, Bond Calculations, several of the calculations convert from bank cubic yards to loose cubic yards and then back to bank cubic yards. We request that you use either bank or loose cubic yards, but do not use them interchangeably. (MSK)
359. Please remove the Motor Grader Productivity Table and Wheel Loader Table from Table 1 of Appendix 4.1-1, Bond Calculations. Motor grader hours are calculated per scraper and loader/truck hours per Policy Memo 16 and wheel loader productivity is specified on page 13 of Policy Memo 16. Please update accordingly. (MDB)
360. Tables 1 and 2 of Appendix 4.1-1 include calculations for reclaiming Pond 3; however, Pond 3 is not scheduled to be constructed during the first permit term. These calculations can be removed from the worst case cost estimate calculations. (MDB)
361. The volumes of spoil required for backfilling the pit area in Tables 1 and 2 of Appendix 4.1-1, Bond Calculations, do not correspond with staff's end area calculations derived from the cross sections. Please provide the end area calculations to support the values provided in Tables 1 and 2. (MDB)
362. Please provide costs for the removal of haul roads constructed out of spoil in Appendix 4.1-1. In accordance with Section 3.1.2.2 haul roads in disturbed areas must be constructed with spoil. This material will need to be redistributed or removed prior to respread of subsoil and topsoil. (MDB)
363. Table 2 of Appendix 4.1-1 uses a 1,500 foot average haul distance for all SPGM respread. This is not acceptable since it appears the closest haul distance is approximately 4,000 feet. Please revise the table to provide separate calculations for the respread of topsoil and subsoil. The table also needs to include the equipment being used, the type of material, identify the stockpile from which it is being hauled from and the area where it will be placed, haul distance from the stockpile to the respread area, bank cubic yards being hauled, and the adjusted production and hours for both topsoil and subsoil materials. (MDB & MSK)
364. Table 2 of Appendix 4.1-1 indicates the calculations were based on a scraper fleet of two and a truck fleet of four. However, when calculating the costs in Table 3 the price of only one scraper and one truck were used, thus cutting the cost of the scraper in half and the truck fleet by one quarter. In addition, hours for the D9 dozer, water wagon, and blade are all calculated from scraper, loader or truck hours. It is strongly suggested that a fleet size of one be used in calculating hours. The methodology to adjust productivity rates for the truck fleet is found on page 13 of Policy Memo 16. Please correct as necessary. (MDB)
365. Table 3 of Appendix 4.1-1 indicates a haul distance of 500 feet for a portion of the truck/loader fleet. A 500 foot haul distance for trucks is not viable or practical as the break-even distance for a truck loader fleet is 4,300 feet. Please change these calculations to a scraper haul and make the necessary adjustments. (MDB & MSK)

366. Table 4 of Appendix 4.1-1 lists all the seed species included in Policy Memo 16. However, it is only necessary to include species in this table that are part of the seed mixtures proposed in the reclamation plan. (MDB)
367. Table 4 of Appendix 4.1-1, Bond Calculations, must include rock picking costs for all disturbed acreage. Please adjust accordingly. (MDB)
368. In Appendix 4.1-1, Bond Calculations - Table 4, the portion of Table 4 labeled Custom Farm Rates can be eliminated with one exception. Except for dry fertilizer application, these rates are already accounted for in the Revegetation Factors portion of the table. By adding the dry fertilizer application costs to the part of the table with other Revegetation Factors, the Custom Farm Rates portion of the table can be removed. (MDB)
369. Table 4 of Appendix 4.1-1 correctly lists the cost of fertilizer as \$0.30 per pound; however, page 14 of Policy Memo 16 states that fertilizer will be applied at a rate of 60 pounds per acre calculating to a cost of \$18.00 per acre. Please make the necessary corrections. (MDB)
370. Revegetation Factors on Table 4 of Appendix 4.1-1 indicate 24.9 acres will be seeded to the rangeland seed mixture. However, the Average Weighted Cost section indicates 74.8 acres will be seeded to the rangeland seed mixture. Please review and correct this discrepancy. (MDB)
371. On Table 4 of Appendix 4.1-1, please eliminate the "Percent Used" column as it is creating erroneous calculations. For example, calculations in the Revegetation Factors section have a per acre cost of \$339.85. When back-calculating from the subtotal, including the additional cost of rock picking, a per acre cost of \$181.41 was determined. The Weighted Average Cost section is inaccurate as well. Please use the subtotals from the previous sections as the values have already been calculated for the acres disturbed and there is no reason for a weighted average. For items that have not been subtotaled, simply multiply acres by cost/per acre to obtain the total cost. This is the most accurate and consistent method of calculating the costs. Please update as necessary. (MDB)
372. Please correct the Field Supervision and Administration cost on Table 6 of Appendix 4.1-1, Bond Calculations. This amount should be 1% of all reclamation costs. Currently it is calculated as 1% of just the earth moving costs. (MDB)
373. On Table 6 of Appendix 4.1-1, Bond Calculations, please correct the Miscellaneous Costs to be 1% of the total of all reclamation costs excluding the administrative and mobilization costs. (MDB)
374. The table below shows the adjusted production rates for a D11 dozer with a universal blade that we recommend when calculating the Worst Case Reclamation Cost Estimate. Please incorporate the adjusted rates into the appropriate tables and recalculate the total hours required. (MDB & MSK)

Feet	Gross (LCY/hr)	Adjusted (LCY/hr)
100	2926	2078
150	2001	1421
200	1528	1085
250	1240	880
300	1045	742
350	905	642
400	798	567
450	715	508
500	648	460
550	592	421
600	546	388
650	507	360
700	473	336

375. The table below contains the adjusted production rates for a 657 Scraper (P-P) that we recommend for calculating the Worst Case Reclamation Cost Estimate. Please incorporate the adjusted rates into the appropriate tables and recalculate the total hours accordingly. (MDB)

Feet	Gross (BCY/hr)	Adjusted (BCY/hr)		Feet	Gross (BCY/hr)	Adjusted (BCY/hr)
100	985	818		2600	430	357
200	926	769		2700	421	349
300	862	716		2800	412	342
400	806	669		2900	403	335
500	757	628		3000	395	328
600	713	592		3100	387	321
700	675	560		3200	380	315
800	640	531		3300	372	309
900	608	505		3400	365	303
1000	580	481		3500	359	298
1100	554	460		3600	352	292
1200	530	440		3700	346	287
1300	509	422		3800	340	282
1400	489	406		3900	334	277
1500	470	390		4000	328	272
1600	453	376		4100	323	268
1700	437	363		4200	317	264
1800	422	350		4300	312	259
1900	408	339		4400	307	255
2000	395	328		4500	303	251
2100	383	318		4600	298	247
2200	372	308		4700	293	244
2300	361	299		4800	289	240
2400	351	291		4900	285	236
2500	341	283		5000	281	233

Note: Haul distances 2,500 feet or less rolling resistance is 10%
Haul distances over 2,500 feet rolling resistance is 6%

Section 5.0 – References Cited

376. While we appreciate the links to reference documents that are provided in Section 5.0, we found that the following links do not connect to the intended reference source:

- a. NDSWC. 2007 Precipitation Data Query links to the Ground and Surface Water Data Query
- b. Murphy, Edward C. 2006a, 2006b, 2007b, 2008
- c. Tychsen, Paul Charles. 1950
- d. NRCS. 2007c, 2006
- e. Armstrong, C.A. 1984
- f. USGS. 2006
- g. NDDA. 2007
- h. Zollinger, Richard. 2004
- i. USFWS. 2007a
- j. USDA NRCS. 2002b, 2005
- k. Franzen, D.W. 2007
- l. Zollinger, R.K. 2007

In some, but not all cases, we are able to repair the link by deleting the (%20) that appears in the address box. However, this must be done every time that we re-activate a link and it is not always successful. Other reviewers of the permit application, including the general public, may not know how to access the linked data using this method. Please repair the broken links in the References of Section 5. (BEB)

The updated application submitted on December 29, 2010, was deemed complete on January 10, 2011. And as of today, March 28, 2011, we have used the entire 120-day review period for conducting the completeness and technical reviews. Due to the large number of deficiencies noted above and the changes that will be required to the application, the review period will be extended for an additional 120 days as allowed by NDAC 69-05.2-05-01(4)(b) upon the submittal of SHC's response to all deficiencies that are noted above.

Also, we will forward you any additional comments we receive from the advisory committee members. If you have questions, please contact our office.

Sincerely,



James R. Deutsch
Director
Reclamation Division

cc: Stark County Auditor